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ABSTRACT

The National Science Foundation funded Calculators and Mathematics Project, Los Angeles (CAMP-LA) developed curriculum materials focused solely on the use of calculators. The project was developed in three stages. The first stage studied the mathematics curriculums from different states and identified topics that are not included but should be if every student had a calculator, topics treated in too much detail, and topics no longer appropriate. Based on this information, CAMP-LA compiled a prototype curriculum organized by grade level to be consistent with the "California Mathematic Framework" strands. The second stage developed lessons to cover the topics through the curriculum. The third stage field tested these lessons in various parts of the country. This book is composed of lessons for grades K-2 in the series. The introduction gives an overview of CAMP-LA, information on how to use the lesson plans, a section on calculator awareness, a discussion of assessment approaches, with sample assessment strategies appearing in each lesson plan, a preliminary lesson on how to keep a calculator journal, and a scope and sequence for the book. The remainder of the book is composed of 32 lessons in four sections: Calculator Awareness, Patterns and Functions, Number, and Algebra. Each lesson is broken down into three sections. The three sections are labeled: "Grade", including grade level, strand, skill required, and purpose; "Management", including class organization, time frame, materials needed, vocabulary, and prerequisite skills; and "Lesson" including suggestions for directed instruction, guided practice, independent practice, evaluation, and home activity. (MDH)

CAMP - LA

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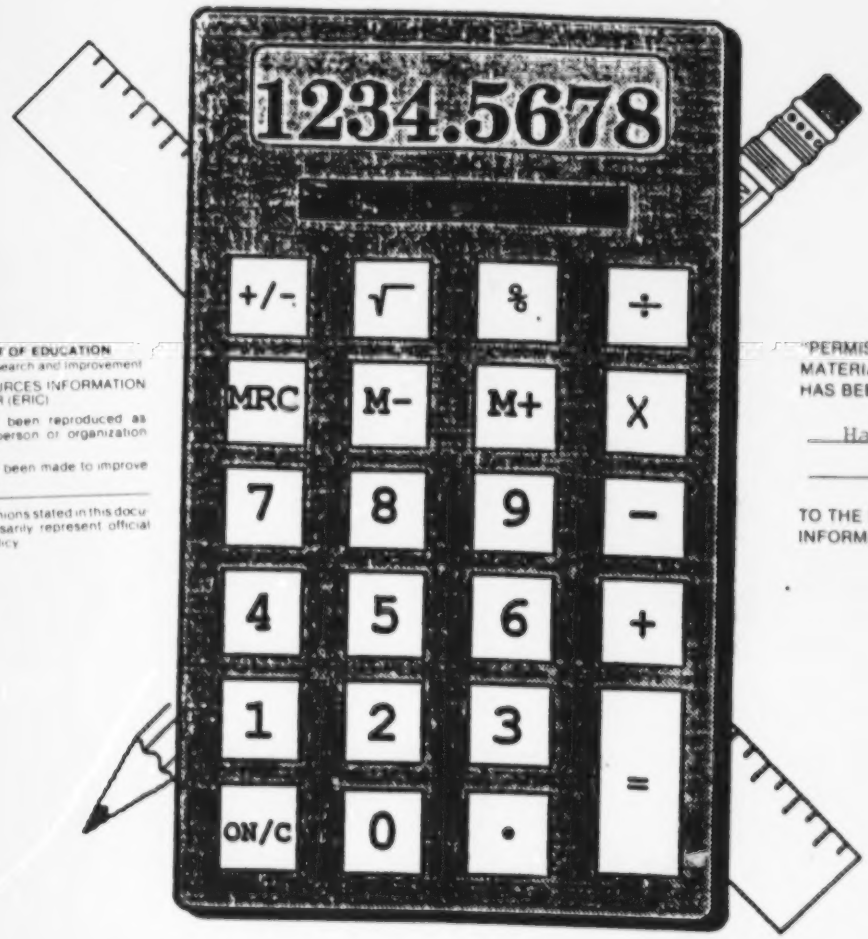

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BOOK 1
GRADES K - 2

Calculators and Mathematics Project, Los Angeles (CAMP - LA)

David Pagni, Editor

Cal State Fullerton Press

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CAMP-LA
BOOK 1
GRADES K - 2

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The following mathematics lessons were produced by the Calculators and Mathematics Project, Los Angeles (CAMP-LA). The project was supported by California State University, Fullerton, Los Angeles Unified School District and the National Science Foundation (Grant #MDR - 8651616). However, the opinions, findings, conclusions or recommendations expressed herein are those of the authors and do not necessarily reflect the views of the National Science Foundation. The lessons were developed around mathematics topics that could be taught or enhanced with the use of a calculator. In some cases the calculator is used to explore or learn a mathematical concept; in other cases, it is used as a computing tool. All lessons were field-tested in the Los Angeles Unified School District in a wide variety of school settings. Sample lessons have been used in workshops for teachers and other mathematics educators across the United States. The CAMP-LA lessons have always been well-received. The directors and writers of CAMP-LA believe that you and your students will find these lessons to be fun and challenging!

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Books by David Pagni:

CAMP- LA Book 1

CAMP- LA Book 2

CAMP- LA Book 3

CAMP- LA Book 4

Math Lessons for Grades K - 3

Math Lessons for Grades 3 - 5

Math Investigations for the Months

PROJECT BACKGROUND

The Calculators and Mathematics Project, Los Angeles (CAMP-LA) was one of six projects[1] in the country funded by the National Science Foundation, Division of Materials Development and Research Instructional Materials Development Program, under a special program solicitation entitled "Materials for Elementary School Mathematics Instruction" in September, 1986. The special solicitation requested proposals that focused on the use of technology in elementary school mathematics.

Of these six projects, only CAMP-LA focussed its efforts soley on the use of calculators. The CAMP-LA philosophy is that every child should have access to a calculator at all times when investigating, studying, or learning mathematics.

The lesson development process spanned three stages. First, the project teams of writers and the two co-directors studied the mathematics curriculum guides from different states. They looked for:

- Topics not treated but which should be (assuming every child has a calculator)
- Topics treated in too much detail
- Topics no longer appropriate

Based on the results of this research, the CAMP-LA staff compiled a prototype curriculum organized around the strands of the *California Mathematic Framework*: Number, Measurement, Geometry, Patterns and Functions, Statistics and Probability, Logic, and Algebra. The CAMP-LA staff next isolated those topics that lent themselves to being taught with the use of a calculator. These topics were organized by grade level and became the CAMP-LA Calculator Continuum.

The second stage of the lesson development process was the writing of lessons that captured the essence of the Calculator Continuum. At this time, we decided to introduce a new strand, the Calculator Awareness strand for lessons designed to introduce students to the mechanics of operating a calculator. Of course, these lessons for introducing the calculator features are written in a mathematics context.

Drafts of lessons were written during the summer, 1987. During the following fall these skeletal lessons were evaluated to see which ones needed to be fleshed out, which needed to be deleted, and where in the Calculator Continuum additional lessons were needed.

The third stage of the CAMP-LA lesson development process was the field testing of the lessons. Because of a nationwide interest in the project, a few lessons were field tested in schools in various parts of the country. However, all lessons were field tested in the Los Angeles Unified School District in a variety of school settings. The CAMP-LA field test teachers turned in written reports including samples of students' work for each lesson. The field test teachers also met with the project writers to discuss the strengths and weaknesses of the various lessons. The field testing went hand - in - hand with new lesson development throughout 1988, 1989, and 1990. During the summer and fall of 1990 the writing teams completed their work and the final editing was completed by David Pagni, Principal Investigator and Co-director of CAMP-LA.

CAMP-LA Books

Book	Grade Level	Cost
Book 1	K – 2	$14.95
Book 2	3 – 4	$14.95
Book 3	5 – 6	$14.95
Book 4	7 – 8	$20.95

[1]The six NSF funded projects were:

1) "A Revision of the Geometry and Measurement Strands, K-6" University of Georgia

2) "Calculators and Mathematics Project, Los Angeles"
California State University, Fullerton

3) "Development of a Logo–Based Geometry Curriculum"
Kent State University

4) "K–6 Supplementary Mathematics Materials for a Technological Society"
New York University

5) "Reckoning with Mathematics: Tools and Challenges for the Information Age"
Education Development Center

6) "Used Numbers: Collecting and Analyzing Real Data"
Technical Education Research Centers

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Calculator Transparency Master xxii
Scope and Sequence xxiii

Chapter 1: ***Calculator Awareness***

Lesson	Title	Objectives	Page
1	Electronic Tools	Recognize the calculator as one of the electronic tools we use in our daily lives.	1
2	Enter and Clear	Learn how to enter and clear numbers and locate information on the display.	7
3	Keyboard Kapers	Locate number keys on a calculator.	10
4	Count Your Digits	Identify the number of digits entered.	14
5	Hit the Target, Find the Winning Number	Use the constant feature to count by ones.	19
6	Find Your Seat	Use the constant feature to count backwards.	26
7	Graph It	Learn how to compute sums.	35
8	Cereal Survey	Learn how to compute differences on the calculator.	40
9	Let's Pretend	Choose the operation, addition [+] or subtraction [-] in a problem solving situation.	45

Lesson	Title	Objectives	Page
10	Show the Parts	Locate, identify and define parts of the calculator for review.	54
11	The Carnival Prize Booth	Review calculator awareness skills and vocabulary in problem solving situations. (Emphasizing counting and sorting.)	60
12	Spend Your Coupons	Review calculator awareness skills and vocabulary in problem solving situations. (Emphasizing addition and subtraction.)	69
	Glossary of Calculator Terms		75

Chapter 2: ***Patterns and Functions***

Lesson	Title	Objectives	Page
13	Create a Pattern	Recognize and Extend patterns.	79
14	Same Name Pattern	Recognize that the same pattern unit can be represented in various ways.	84
15	Number Design	Identify number patterns and count by multiples.	89
16	Discover and Compare	Identify patterns, count by multiples and compare number patterns.	94
17	A Snack Pattern Problem	Look for a pattern as a problem solving strategy.	102
18	Looking for a Pattern	Look for a pattern as a problem solving strategy.	109
19	Explore a New Key and Find a Pattern	Recognize and extend number patterns.	116

Chapter 3: *Number*

Lesson	Title	Objectives	Page
20	It Counts	Count by numbers other than one to build the foundation for understanding the concept of multiples and remainders.	124
21	Super Circus	Count to a given number using only the [0], [1], [+], [-], [=], and [on/c] keys.	133
22	Taking Care of Business	Choose the operation, addition [+] or subtraction [-], in problem solving situations.	138
23	Number Magic	Use place value to change digits in two-digit numbers.	149
24	How Many Tiles?	Discover that multiplication is repeated addition.	154
25	The Parade!	Use one or two-digit multiplication in problem solving situations.	160
26	How Many Handfuls?	Division: Given the quantity of objects and the number in each group, find the number of groups.	165
27	Bob's Birthday Party	Division: Given the quantity of objects and the number in each group, find the number of groups, in a problem solving situation.	171
28	Calco Electronics Part 1	Division: Given the quantity of objects and the number of groups, find how many in each group.	177
29	Calco Electronics Part 2	Choose the operation(s) [+], [-], [x], [÷] in problem solving situations.	189
30	Solve the Mystery	Find squares and whole number square roots of numbers.	193

Chapter 4: ***Algebra***

Lesson	Title	Objectives	Page
31	Tiles-R-Us	Solve equations using the memory keys: [M+] and [MRC].	206
32	The Stadium	Solve equations using the memory keys: [M-], [M+] and [MRC].	215

CAMP-LA OVERVIEW

The **Calculators and Mathematics Project, Los Angeles (CAMP-LA)** provides materials for grades K-8 that use calculators to enhance mathematics instruction. The integration of the calculator into the elementary school mathematics curriculum in meaningful and useful ways is the basic goal of the project. All lessons are written under the assumption that every child has access to a calculator.

The lessons produced by the **Calculators and Mathematics Project, Los Angeles**:

- Allow students to investigate keys on the calculator and discover their functions.
- Help students become confident and comfortable using the calculator as an effective tool for exploring mathematical concepts.
- Assist students to make the connection between the concrete and the abstract.
- Emphasize conceptual development, numerical relationships, and application in real-life experiences.
- Encourage the discovery of patterns in our number system.
- Help students gain confidence with numbers by using the language, symbols and processes of mathematics.
- Introduce more complex mathematical problems at an earlier age.
- Remove computational restraints so that students can focus on the processes of solving problems and develop problem-solving skills and strategies.
- Develop students' ability to choose how and when to use a calculator.
- Enable students to reason logically and develop an intellectual curiosity toward mathematics.

CAMP-LA lessons support the philosophy expressed by the California State Department of Education *Mathematics Framework for California Public Schools* and the National Council of Teachers of Mathematics *Curriculum and Evaluation Standards for School Mathematics.*

SPECIAL CHARACTERISTICS OF CAMP-LA LESSONS

The calculator lessons reinforce, enrich, and extend mathematical concepts. They facilitate the investigation of a wide range of topics.

- A **SCOPE AND SEQUENCE** chart guides teachers in selecting lessons. Students begin at the Calculator Awareness strand and proceed through Patterns and Functions, Number and Algebra. Geometry, Measurement, Statistics and Logic are interwoven in the four strands. ***It is suggested that teachers do not move across a row in the Scope and Sequence Chart until the preceding Awareness lessons have been taught.***

- **CALCULATOR LESSONS** are listed in sequential order by title and objective for each strand.

- The **PREFACE** includes a brief overview of each strand and explains how the calculator will enhance mathematics instruction.

- Lesson plans are presented in a **CHART FORMAT** to help teachers focus on concept development.

- **CALCULATOR AWARENESS** is a strand introduced at the K-2 level to teach the mechanics of the calculator through meaningful real-life situations. A Glossary of Calculator Terms is included after the last Calculator Awareness lesson.

- **MATHEMATICAL CONCEPTS** are developed through the use of concrete materials, situational lessons, and problem solving experiences.

- Students use the **CALCULATOR JOURNAL** to explain in writing the mathematical concepts developed within each lesson. The Calculator Journal is one of the ways that teachers can assess how a student's productive work changes over time. (See Calculator Journal Lesson on page xviii.)

- Alternative **ASSESSMENT STRATEGIES** are included in the Evaluation section of every lesson to ensure the connection between instruction and assessment.

CAMP-LA lessons for grades K-2 were field tested by teachers and students who used calculators with these features:

- constant function for addition and subtraction
- clear key which erases everything from the display
- clear entry key which erases only the last entry
- memory recall/clear key which is used to recall information in the memory and to clear the memory

USING THE LESSON PLAN

The first section of the lesson plan includes **TEACHER NOTES:**

CAMP-LA	**LESSON TITLE**
GRADE LEVEL:	Suggested grade levels are provided.
STRAND:	A content strand is identified (Calculator Awareness, Patterns and Functions, Number, or Algebra).
SKILL(S):	The specific mathematics skill(s) are identified.
MANAGEMENT CLASS ORGANIZATION:	Recommendations are made relating to group size (total class, small group, or pairs).
TIME FRAME:	A suggested time frame is provided to assist the teacher in scheduling.
MATERIALS:	A list of materials is included. (Student Record Sheets and Home Activity Sheets are provided when appropriate.)
PREREQUISITE SKILLS:	Prerequisite skills are identified with reference to mathematical knowledge and mechanics of the calculator.

The second section of the lesson plan includes the **LESSON:**

LESSON

DIRECTED INSTRUCTION:

Lessons are sequentially developed and include background information and suggestions for delivery of instruction:

- **Problem Solving**
- **Concrete Materials**
- **Cooperative Learning**
- **Mathematical Language**
- **Situational Lessons**

Questions are provided to help the teacher:

- Stimulate critical thinking
- Focus on concepts to be developed
- Encourage student involvement
- Informally assess student progress

Possible answers to questions are included to help the teacher guide the students in **understanding mathematical concepts** to be developed.

Suggestions are provided to encourage **student involvement** and establish the teacher's role as facilitator.

GUIDED PRACTICE:

Students are provided practice under the teacher's guidance so that eventually they can apply their mathematical knowledge independently.

INDEPENDENT PRACTICE:

Student Record Sheets are provided to reinforce mathematical concepts. (**Answer Keys** are included.) There is a separate record sheet for each grade level when appropriate.

EVALUATION:

A variety of evaluation methods are used to:

- Assess students' understanding of mathematical concepts.
- Judge whether the use of the calculator was effective and efficient in solving the problems.
- Bring mathematical closure to the lesson.

HOME ACTIVITY EXTENSION:

Home Activity Sheets and suggestions for **Extension Activities** provide additional opportunities to apply mathematical concepts in various situations.

FORMAT

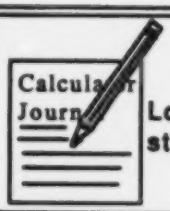
Lesson plans are presented in a chart format:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Provide suggestions for delivery of instruction such as: • use of concrete materials • role playing • charts • graphs • etc.	Provide questions that will: • stimulate critical thinking • focus on concepts to be developed • encourage student involvement	Provide possible answers to help the teacher guide the students in understanding concepts to be developed.	Provide suggestions to encourage student involvement and establish the teacher's role as a facilitator.

➡ The chart reads from left to right.

MANAGEMENT

The logo will appear in each lesson to indicate when it is time to distribute calculators to the students.



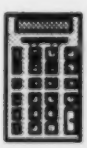
Look for this logo in each lesson as a reminder to have students make regular entries in their Calculator Journal.

CALCULATOR AWARENESS

Students should be taught how and when to use the calculator so that it becomes an effective and efficient tool. As students develop **Calculator Awareness**, they realize that proper use of the calculator necessitates a knowledge of basic facts and strengthens number sense as well as thinking skills. Students need to know which keys to press in order to solve a mathematical problem. Making judgments about the results of a calculation and interpreting the results require an understanding of the mathematics involved.

To help students develop **Calculator Awareness** they need to understand the following:

- **Calculators have many uses at home, school, and work.**
- **Learning the location of the keys and their functions is important because people make calculators think.** Someone must press the keys so that the calculator can process data entered and display the results.
- **Calculators have different power sources.** Most calculators are powered by solar cells while others are powered by batteries. Solar-powered calculators work when enough light shines on the solar panel to provide the energy.
- **There are different ways to display data on calculators.** Some calculators have visual screens (displays) while others print on paper.
- **There are many brands of calculators** that may differ in functions and come with a variety of features, including the counting constant, multiplying and dividing constant, and memory. The sequence of procedures for entering data can vary.
- **Calculators are limited in the number of digits they can display.**
- **Proper care of the calculator is necessary for maintenance.**



The **Calculator Awareness Strand** provides lessons for K-2 students that teach the mechanics of the calculator. However, all students need to participate in exploratory activities to discover how calculators work. **When students become confident and comfortable using the calculator, then it becomes an effective tool for exploring mathematical concepts.**

CAMP-LA ASSESSMENT

The purpose of assessment is to enhance learning and improve teaching. For the student, assessment indicates a measure of mathematical knowledge and power. For the teacher, it indicates how the instructional program should be modified. Teacher observation of students' actions and interactions gives information about mathematical knowledge, understanding of concepts, and ability to apply reasoning and analysis to solve problems. Assessment strategies are included in the Evaluation section of every lesson to ensure the connection between instruction and assessment.

Assessment Examples From Selected Lessons

• CALCULATOR JOURNAL	See Calculator Journal lesson on page xviii.
• INVESTIGATIONS	Students discover, extend and create mathematical patterns as they explore the use of the constant feature on the calculator.
• OPEN-ENDED QUESTIONS	Students list ways to spend a given amount of coupons at a carnival.
• PERFORMANCE	Students collect data to complete a cereal survey and decide how the calculator can be used effectively.
• OBSERVATIONS	Students enter a number into their calculator and tell how many digits appear on the display.
• SELF-ASSESSMENT	Students count by numbers other than one to build the foundation for understanding the concept of multiples and remainders. Then they are asked to tell about the mathematics they learned.

CALCULATOR JOURNAL

GRADE: K - 2

STRAND: Assessment tool for all strands.

SKILL: Monitor and assess student progress in calculator skills and vocabulary. Integrate language arts and mathematics.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Students spend approximately 10-15 minutes writing about what they have learned. The teacher decides how often students should write in their journals.

MATERIALS:

- Overhead calculator
- Calculator Journal cover page
- Calculator Journal writing pages
- Pencil and crayons for each student

VOCABULARY: Solar panel light, on/clear key, display screen, number keys, add key, subtract key, digits, equation, quantity, etc.

PREREQUISITE SKILLS: Express ideas verbally or in writing.

LESSON

- **DIRECTED INSTRUCTION:**

  Kindergarten Calculator Journal

  Kindergarten students can write or dictate language experience stories.

  First/Second Grade Calculator Journal

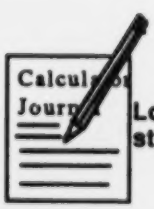
  1. Teacher can assemble a Calculator Journal for each student and have them design the cover.
  2. Students follow the directions written on the journal entry page and record entries on the pages provided.

- **EXTENSION:**

  Here are some classroom management ideas.

  Students can:

  - Dictate a group entry and copy from the chalkboard.
  - Complete this sentence:
    Today I learned that ...
  - Write their own entry
  - Answer EVALUATION questions for selected lessons.



Look for this logo in each lesson as a reminder to have students make regular entries in their Calculator Journal.

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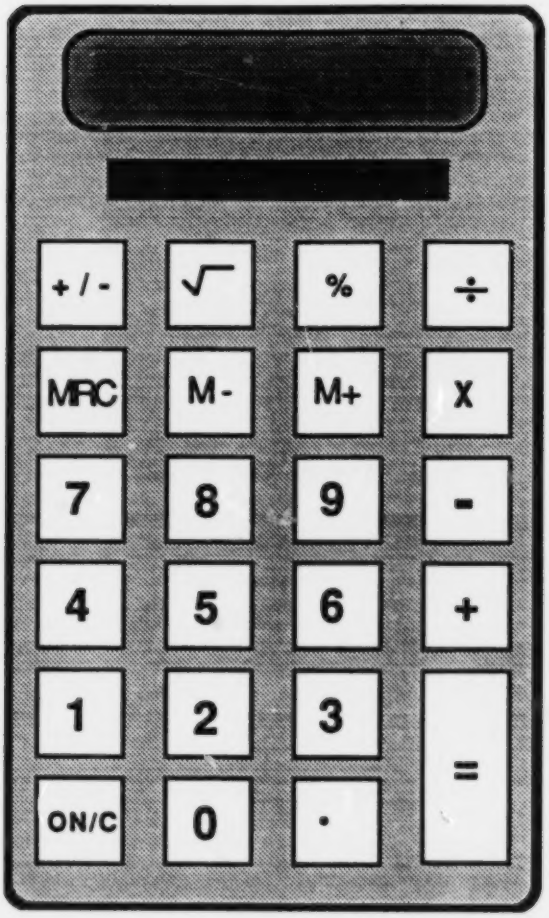

My Calculator Journal

by

_____

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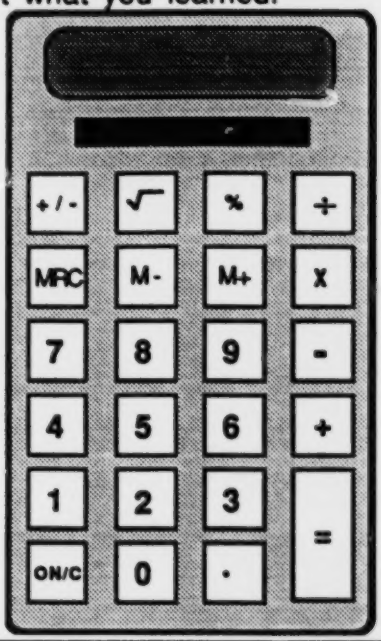
Name:_____ **Date:**_____

DIRECTIONS: Color the key(s) or the part(s) of the calculator you used. Then write about what you learned.



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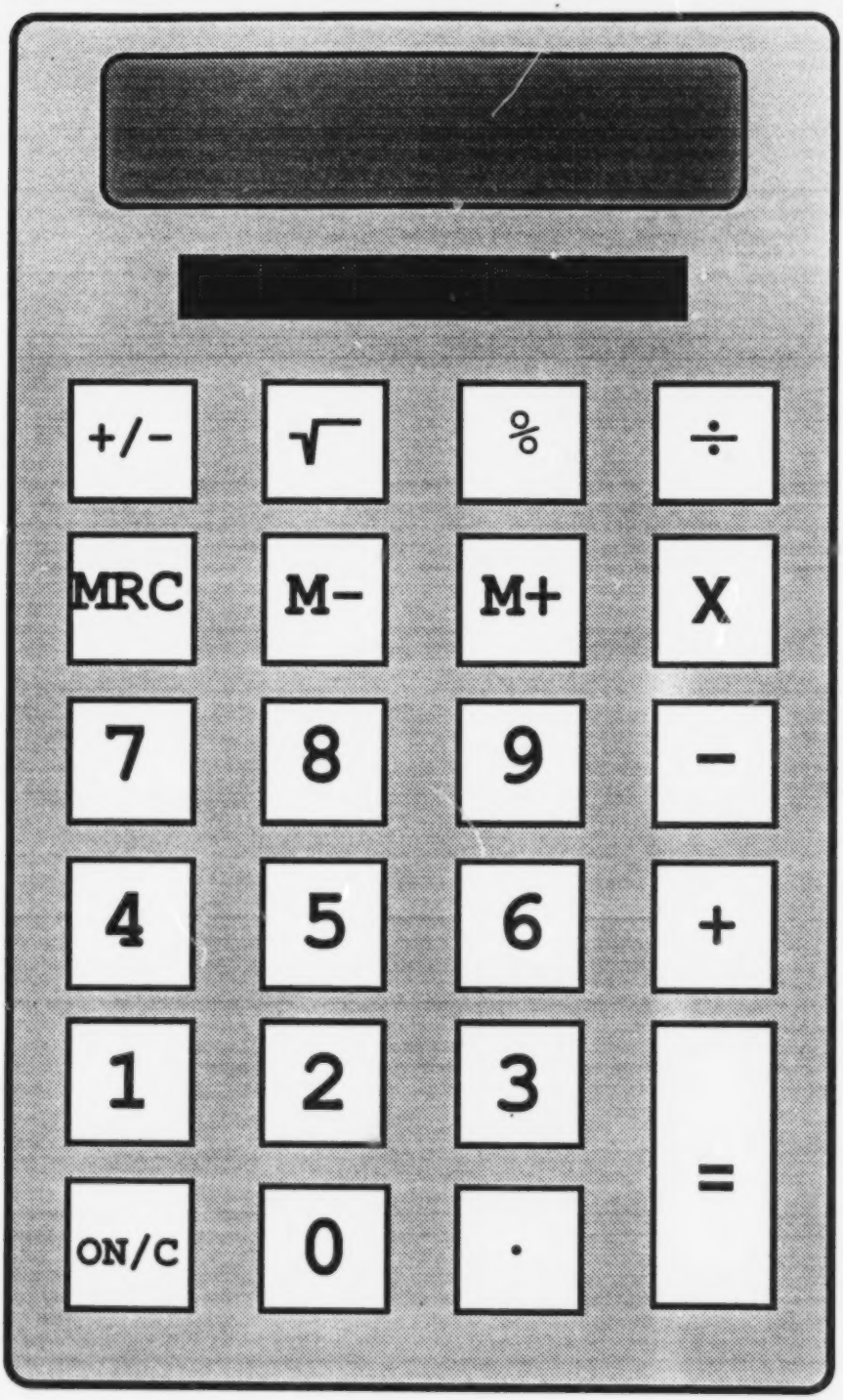
CALCULATOR TRANSPARENCY MASTER



K - 2 SCOPE AND SEQUENCE

CALCULATOR AWARENESS	PATTERNS AND FUNCTIONS	NUMBER	ALGEBRA
Lesson 1 Electronic Tools			
Lesson 2 Enter and Clear			
Lesson 3 Keyboard Kapers			
Lesson 4 Count Your Digits	Lesson 13 Create a Pattern		
	Lesson 14 Same Name Pattern		
Lesson 5 Hit the Target, Find the Winning Number	Lesson 15 Number Design	Lesson 20 It Counts	
	Lesson 16 Discover and Compare		
Lesson 6 Find Your Seat		Lesson 21 Super Circus	
Lesson 7 Graph It			
Lesson 8 Cereal Survey			
Lesson 9 Let's Pretend		Lesson 22 Taking Care of Business	
Lesson 10 Show the Parts	Lesson 17 A Snack Pattern Problem	Lesson 23 Number Magic	
Lesson 11 The Carnival Prize Booth	Lesson 18 Looking for a Pattern	Lesson 24 How Many Tiles?	Lesson 31 Tiles-R-Us
Lesson 12 Spend Your Coupons		Lesson 25 The Parade!	
	Lesson 19 Explore a New Key and Find a Pattern	Lesson 26 How Many Handfuls?	Lesson 32 The Stadium
		Lesson 27 Bob's Birthday Party	
		Lesson 28 Calco Electronics Part 1	
		Lesson 29 Calco Electronics Part 2	
		Lesson 30 Solve the Mystery	

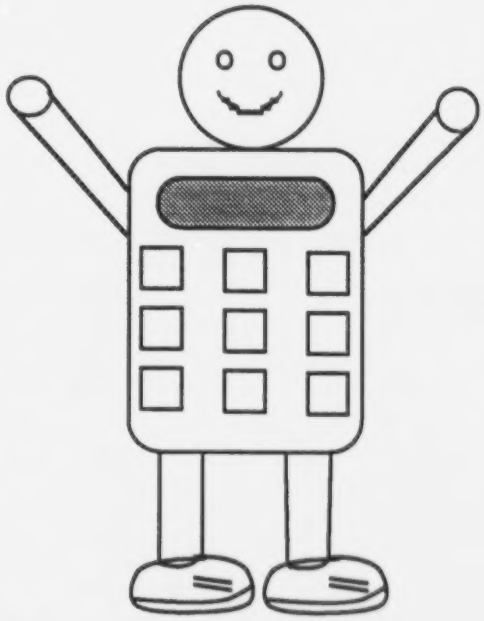
CAMP-LA

CALCULATORS AND MATHEMATICS PROJECT, LOS ANGELES

CHAPTER 1

CALCULATOR AWARENESS

K-2



ELECTRONIC TOOLS

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

SKILL: Exploring the calculator: Recognize the calculator as one of the electronic tools we use in our daily lives.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:

- Electronic Tools Transparency
- Electronic Tools Poster (optional)
- Calculator for each student
- Any machines available that are represented on the Electronic Tools Chart
- Take-Home Activity

VOCABULARY: Calculator, electronic tool, more, less, most, least, graph, interpretation, information

PREREQUISITE SKILLS: Participate in oral language activities

LESSON

- **DIRECTED INSTRUCTION:**

The logo will appear in each lesson to indicate when it is time to distribute calculators to the students.

1. Teacher introduces the machines on the Electronic Tools Chart using a transparency or a poster (made from the chart): "Today we are going to talk about electronic tools that help us in our daily lives." (Show samples of electronic tools for motivation.)

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2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Ask these discussion questions as students look at the transparency or poster and samples of electronics tools.	Which electronic tools can you name?	(Refer to the poster)	
	Where can you find the electronic tools?	• Home • Stores • Offices • Cars • School	
	How do they help you?	• Tell people things (accept all other reasonable answers)	
	Who uses them?	• Scientists • Astronauts • Doctors • Bankers • Teachers • Salespersons • etc.	
	Which tools help us with numbers?	• Calculator • Computer • Cash register • Bathroom scale • etc.	
	How do they help us with numbers?	• Count • Tell us how much we weigh • Solve problems • etc.	
	Which electronic tools have you used?	Answer will vary.	
Today we are going to learn about the calculator and how we can use it as a tool to experiment with numbers.			
Distribute a calculator to each student.			Explore the calculator for approximately 5 minutes.

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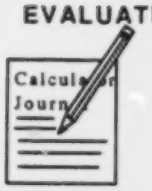
- **EVALUATION:**



After students have had time to explore the calculator, ask the following questions.

- What was one thing you found out about the calculator?
- Can you think of other ways you can use the calculator?
- Students can write more about their Electronic Tools Graph in their Calculator Journal using the words "most" and "least."

Teacher says: "In our next lesson we will learn more about how to use the calculator as a tool in mathematics."

- **HOME ACTIVITY:**

Follow directions on the Take-Home Activity for your grade level.

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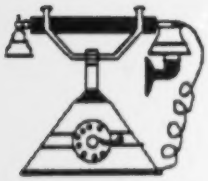
NAME _____

Take-Home Activity: Electronic Tools Graph

1. Color the number of electronic tools you find in your home.
2. Add one electronic tool that is not on your graph.



0	1	2	3	4	5

0	1	2	3	4	5

0	1	2	3	4	5

0	1	2	3	4	5

0	1	2	3	4	5

0	1	2	3	4	5

	0	1	2	3	4	5

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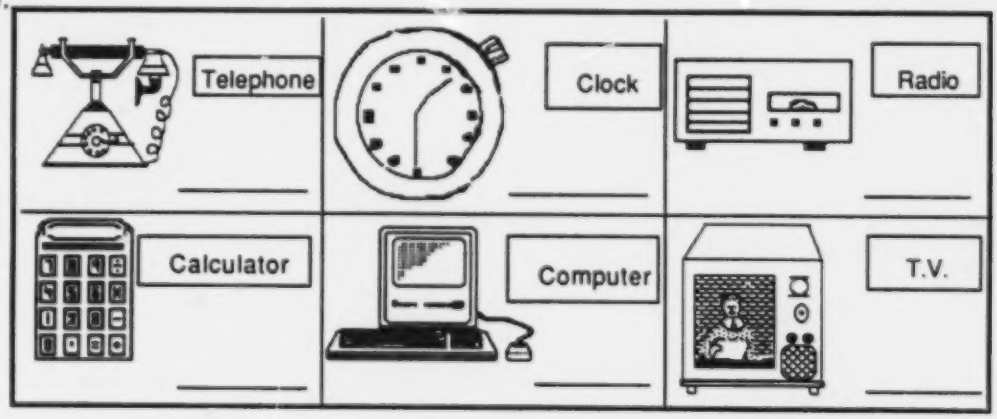
Name _____

Take-Home Activity: Electronic Tools Graph

Color the number of boxes to show how many of each electronic tool you find in your home.

	0	1	2	3	4	5	6
Telephone							
Clock							
Radio							
Calculator							
Computer							
T.V.							

1. Use the information on your graph to help you record the number of tools found in your home.



2. I have more _____ (Tools) than _____ (Tools) in my home.

3. I have fewer _____ (Tools) than _____ (Tools) in my home.

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Electronic Tools

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ENTER AND CLEAR

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

SKILL: Exploring the calculator: Learn how to enter and clear numbers and locate information on the display.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator or calculator transparency
- Calculators for each student
- Different types of calculators (printer, battery operated, solar, etc.)

VOCABULARY: Keys, display, on/clear key, power source, solar, light

PREREQUISITE SKILLS: Eye-hand coordination, recognize numbers 0-9.

LESSON

- **DIRECTED INSTRUCTION:**

1. Teacher says: "In our last lesson we learned about how calculators were tools to help us with numbers. How many of you found them in your home? Did the calculator(s) you found at home look like the ones we use at school?"

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2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS
Here are some calculators that we have in our classroom.	How are these calculators alike?	• Keys • Display • Clear key • People make calculators think.
	How are these calculators different?	• Calculator type • Power source (solar light, battery) • Size • Shape • Color
Distribute a calculator to each student.		
The teacher uses the overhead calculator or calculator transparency to help students find the designated items on their calculators: • Power source • On key (if applicable) • Display • Number keys • Clear key [C] or [ON/C]	What is the power source?	Solar
	What happens when you cover the solar cells?	The numbers disappear.
	What is the display?	Where the numbers appear after you press the number keys.
	What number keys appear on your calculator?	0,1,2,3,4,5,6,7,8,9
	How do you show 12 on your display?	Press 1 and 2.
	What happens when you press clear?	Zero appears on the display.

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- **GUIDED PRACTICE:**

3. Follow these steps:

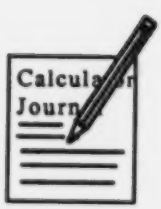
TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
For practice, have students enter the following: • their age, then press [C] • room number, then press [C] • telephone number, then press [C] • number of students in the class, then press [C]	What other numbers could we enter into the calculator?	• Number of chairs in the room. • A number less than 100 or greater than 100. • Number of letters in your last name.	Enter these numbers into the calculator.
Ask these questions to help students discover the maximum number of digits the display will accomodate.	How many 3's do you think will fit on the display?	Allow students to make a guess.	Enter 3's until the calculator display is filled and then tell the answer. (8)
Have students try other numbers to discover that the maximum number of digits will always be 8.	How may 4's fit on the display? How many 5's, etc.	8	
	What key do you need to press each time you want to clear your display?	[C] or [ON/C]	

- **INDEPENDENT PRACTICE:**

  Students can continue exploring the keys on their calculators utilizing the information they learned in this lesson.

- **EVALUATION:**

  How did the calculator give us information? (Encourage students to respond using the calculator vocabulary words developed in this lesson: keys, display, on/clear key, power source, solar, light)



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KEYBOARD KAPERS

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

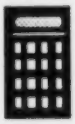
SKILL: Exploring the calculator: Locate number keys on a calculator.

MANAGEMENT

CLASS ORGANIZATION: Total class

SUGGESTED TIME FRAME: Half-hour

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each student
- Calculator Flash Cards
- Scissors
- Keyboard Post-Test
- Calculator for each student
- Calculator Flash Cards
- Scissors
- Keyboard Post-Test

VOCABULARY: Keyboard, index finger, row, column

PREREQUISITE SKILLS: Identify numbers 0 to 9

LESSON

- **DIRECTED INSTRUCTION:**

1. Teacher says: "People who use computers, typewriters and calculators have to learn where the keys are located. This helps them work faster and keep from making mistakes. Today we are going to learn how to use the calculator keyboard."

2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator to each student. Place overhead calculator on projector. Point to the keyboard.	What is this part of the calculator called?	Keyboard	
	What did you notice about the location of the numbers on your keyboard?	[0] is on the bottom row. [1][2][3] are in the same row [4][5][6] are in the same row [7][8][9] are in the same row [1][4][7] are in the same column. Accept all other reasonable answers.	Locate the numbers 1 to 9 on the keyboard and press them in sequence. * Remember that the display only accommodates eight digits.

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- **GUIDED PRACTICE:**

Here are some classroom management ideas:

Establish a signal so that students will know when to stop pressing the keys on the keyboard. (For example:"Hands Up")

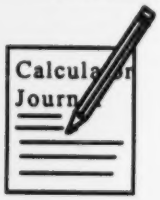
Remind students to use their index finger to press the keys on the calculator and never a pencil or other objects.

Have students enter the number as follows:		
Teacher says:	Enter [1][2][3]	*Hands up,check display, clear
	Enter [4][5][6]	Hands up,check display, clear
	Enter [7][8][9]	Hands up,check display, clear
	Enter [7][4][1][0]	Hands up,check display, clear
	Enter [8][5][2]	Hands up,check display, clear
	Enter [9][6][3]	Hands up,check display, clear
	Enter [0][2][6]	(The zero will not appear on the display because it was entered first.)

- **INDEPENDENT PRACTICE:**

Each student needs to cut a set of Calculator Flash Cards and use them to practice entering numbers on the calculator.

- **EVALUATION:**



- How can you remember where the numbers are located on your keyboard? Accept all reasonable answers. Encourage students to use the words "row" and "column".
- Administer KEYBOARD POST-TEST. (All keyboards are not the same. Alter as necessary.)

- **EXTENSION:**

Have students make their own flash cards to practice accuracy and speed. Students can exchange sets of flash cards for more practice.

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CALCULATOR FLASH CARDS

789	446
639	159
3210	6842
753	951
58	91

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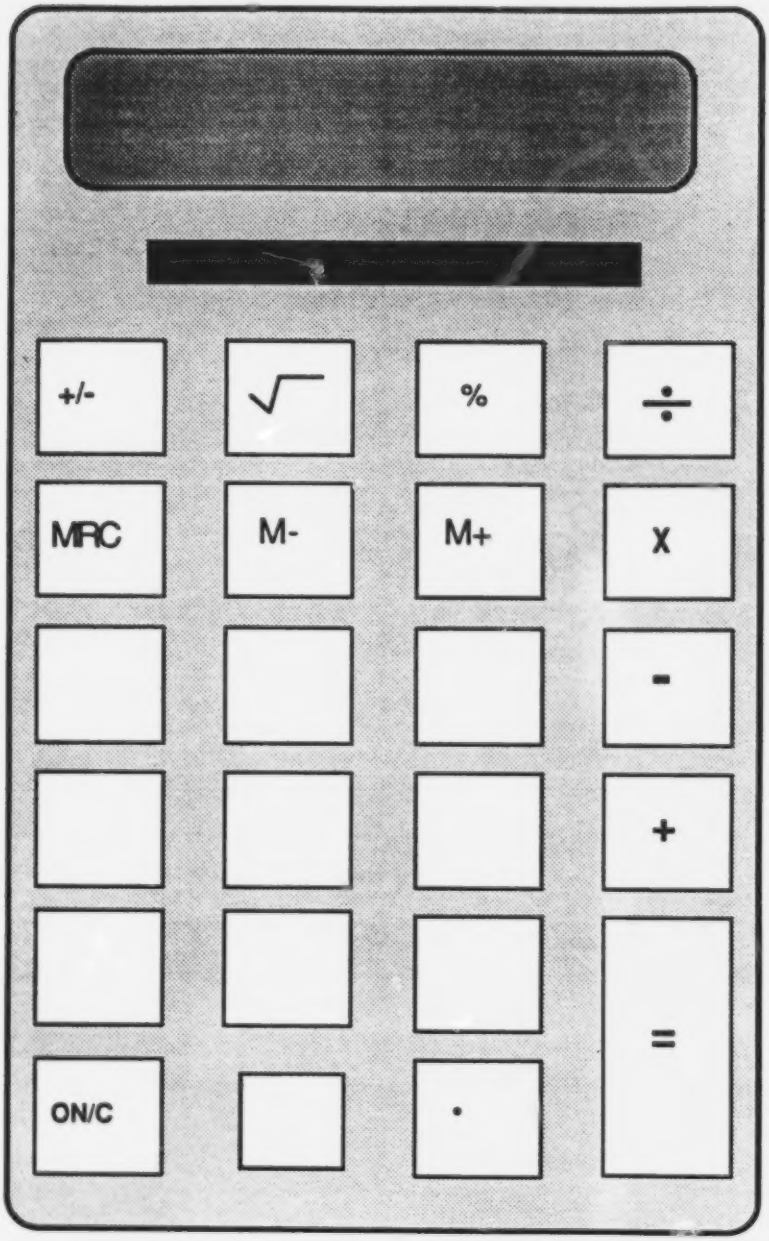
KEYBOARD POST-TEST

WRITE THE NUMBERS 0 TO 9 ON THE CORRECT KEYS.



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COUNT YOUR DIGITS

GRADE LEVEL: K - 2

STRAND: CALCULATOR AWARENESS

SKILL: Exploring the calculator: Identify the number of digits entered.

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator
- Calculator for each student
- Count Your Digits Record Sheet (Kdgn, 1st or 2nd)
- Pencil

VOCABULARY: Digit, enter, clear, display

PREREQUISITE SKILLS: Completion of Lesson 3

LESSON

- **DIRECTED INSTRUCTION:**

1. Follow these steps:

TEACHER DIRECTIONS	ASK THE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator to each student and place the overhead calculator on the projector.			
Enter a one digit number into the overhead calculator.	What number is on the display?	The number 7 is on the display.	
Seven is a one digit number.	What is another one digit number?	5, 8, 3, etc...	Enter a one digit number into the calculator, read it to a friend, and then press [C].
Repeat the same procedure for two and three digit numbers. (You may want to extend the lesson to four or five digit numbers.)			

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- **GUIDED PRACTICE:**

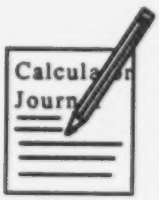
  2. Complete the Count Your Digits Record Sheet.

  3. Read these numbers:
     (For example: Four-two-one rather than Four hundred twenty-one)

	Kdgn.		First		Second
	421	1)	39	1)	23
	35	2)	1987	2)	754
	77	3)	55	3)	1468
	60	4)	219	4)	590
	809	5)	6	5)	4362
	5	6)	309	6)	2106
	16	7)	444	7)	4
	322	8)	600	8)	12832
	111	9)	7543	9)	8945
	540	10)	9	10)	623

EVALUATION:

Ask students to enter a number into their calculator and tell how many digits appear on the display.



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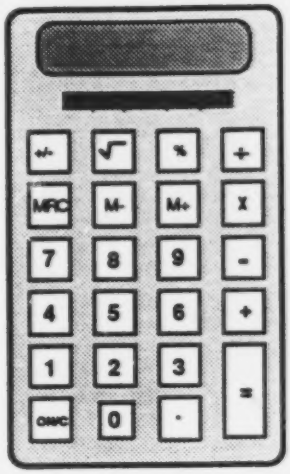

COUNT YOUR DIGITS RECORD SHEET - KDGN

1. Your teacher will read a number.
2. Enter that number into your calculator.
3. Circle the number that tells how many digits you see on your display.
4. Follow the same steps for each number your teacher reads.

	0	1	2	3
	0	1	2	3
	0	1	2	3
	0	1	2	3
	0	1	2	3
	0	1	2	3
	0	1	2	3
	0	1	2	3
	0	1	2	3
	0	1	2	3

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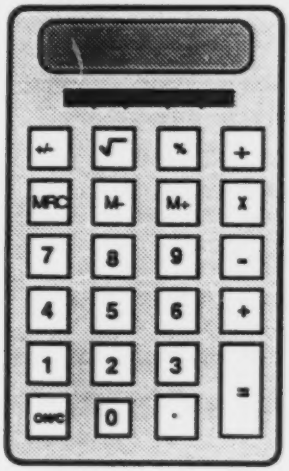

COUNT YOUR DIGITS
RECORD SHEET - 1ST

1. Your teacher will read a number.
2. Enter that number into your calculator.
3. Write the number that tells how many digits you see on your display.
4. Follow the same steps for each number your teacher reads.

1)_____ 2)_____ 3)_____ 4)_____ 5)_____

6)_____ 7)_____ 8)_____ 9)_____ 10)_____

5. Make up your own numbers.
6. Enter them into the calculator.
7. Write them in the correct box.

2 DIGITS	3 DIGITS	4 DIGITS

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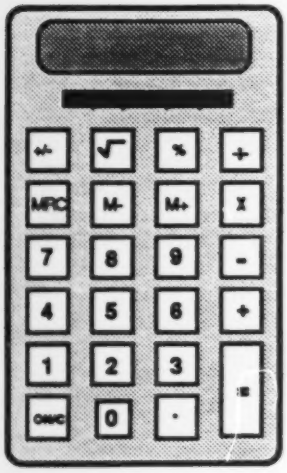
Name_____



COUNT YOUR DIGITS
RECORD SHEET - 2ND

1. Your teacher will read a number.
2. Enter that number into your calculator.
3. Write the number that tells how many digits you see on your display.
4. Follow the same steps for each number your teacher reads.

1)_____ 2)_____ 3)_____ 4)_____ 5)_____

6)_____ 7)_____ 8)_____ 9)_____ 10)_____

5. Make up your own numbers.
6. Enter them into the calculator.
7. Write them in the correct box.
8. Circle the number you think is the largest in each column.

3 DIGITS	4 DIGITS	5 DIGITS

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HIT THE TARGET, FIND THE WINNING NUMBER

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

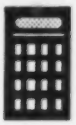
SKILL: Exploring the calculator: To use the constant feature to count by ones.

MANAGEMENT:

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each student
- Hit the Target, Find the Winning Number Record Sheet (Kdgn, First, Second and the blank form)
- Pencil

VOCABULARY: Constant feature, symbol

PREREQUISITE SKILLS: One-to-one correspondence, identify numbers 0-9, count in sequence.

LESSON

- **DIRECTED INSTRUCTION:**

  The procedures for using the constant feature may differ among calculators. Alter the directions if necessary.

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1. Follow these steps

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	How many different ways can we count the number of students in this classroom?	Students brainstorm ideas: Count out loud. Count people. Use the calculator.	
Distribute a calculator to each student and place the overhead calculator on the projector.			
"Today let's try using the calculator to count the number of students in our class."	What number should we start with when we count?	one	
I'll press [C], [+] , [1] and then [=].	What number do you see on my display screen?	1	Press [C], [+] , [1] and then read the display. [1]
Walk around the room and clap once each time, while walking by a child, until all students have been counted.			Each time the teacher claps, press [=] and read the number on the display.
Record the total number of students on the chalkboard.			

2. Follow these steps for discussion:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	What happened each time you pressed the [=] key?	The number got bigger by one.	
The [=] can be a counting key.	How did we use the [=] to help us count?	• Press [+] • Press [1] • Press [=] • Continue pressing [=] to count.	

- **GUIDED PRACTICE:**

3. Use the [=] to count to 50. Have Kdgn students read each number orally. First and second graders can read the numbers silently.

4. Write a two or three digit "Target Number" on the chalkboard and have students press [+] [1] [=] and continue pressing [=] until the "Target Number" appears on their calculator display.

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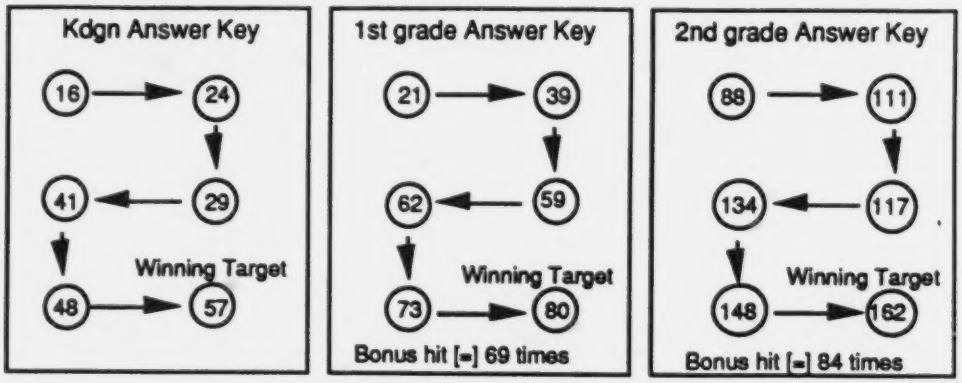
5. Write a starting number such as 6 and a "Target Number" and have students press [6] [+] [1] [=] and continue pressing [=] until the "Target Number" appears on their calculator display.
This will give students practice with counting on from a starting number.

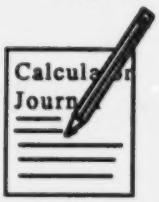
- **INDEPENDENT PRACTICE:**
  1. Use the Hit the Target, Find the Winning Number Record Sheet. (Kdgn, 1st and 2nd)

  - ***Encourage students to predict their target numbers before hitting the [=].***



2. Students can design their own Hit the Target, Find the Winning Number Record Sheet using the blank form. (Count by ones, twos, threes, fours, etc. See EVALUATION section.)

- **EVALUATION:**



Ask students how they could use the calculator to count by 2, 3, etc.? See if they can come up with a system to make this discovery. (To count by 2, press [+], [2], [=], [=], etc.)

- **HOME ACTIVITY:**
  Count other things using the calculator such as trees, pets, houses etc.

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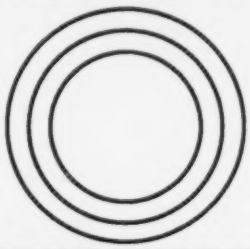
NAME_____

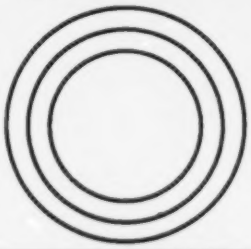
HIT THE TARGET, FIND THE WINNING NUMBER - KDGN

START: PRESS [6] [+] [1]

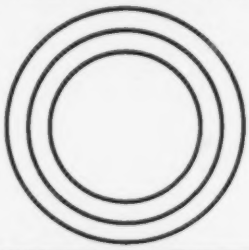
HIT [=] 10 TIMES.
WRITE YOUR TARGET NUMBER.



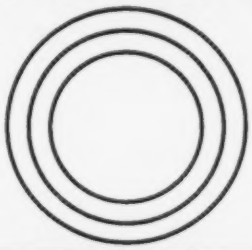
HIT [=] 8 MORE TIMES.
WRITE YOUR TARGET NUMBER.



HIT [=] 12 MORE TIMES.
WRITE YOUR TARGET NUMBER.

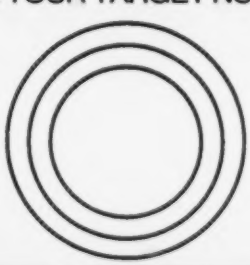


HIT [=] 5 MORE TIMES.
WRITE YOUR TARGET NUMBER.

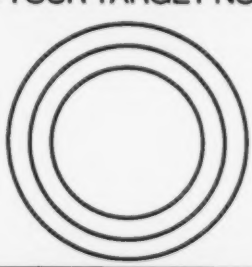


WINNING NUMBER

HIT [=] 7 MORE TIMES.
WRITE YOUR TARGET NUMBER.



HIT [=] 9 MORE TIMES.
WRITE YOUR TARGET NUMBER.



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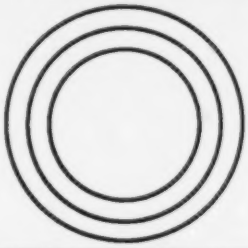
NAME_____

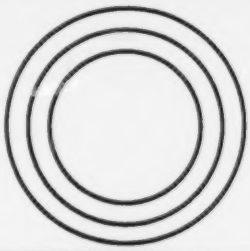
HIT THE TARGET, FIND THE WINNING NUMBER - 1ST

START: PRESS [11] [+] [1]

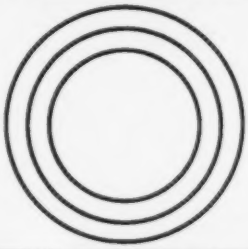
HIT [=] 10 TIMES.
WRITE YOUR TARGET NUMBER.



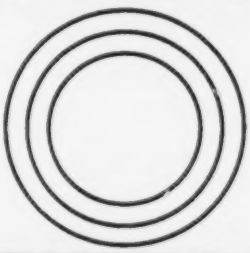
HIT [=] 18 MORE TIMES.
WRITE YOUR TARGET NUMBER.



HIT [=] 3 MORE TIMES.
WRITE YOUR TARGET NUMBER.

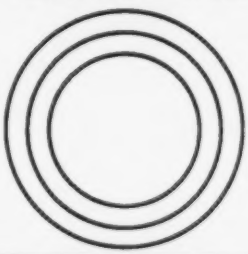


HIT [=] 20 MORE TIMES.
WRITE YOUR TARGET NUMBER.

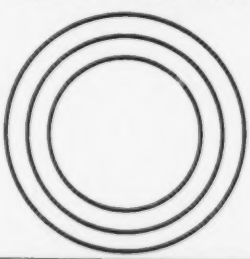


WINNING NUMBER

HIT [=] 11 MORE TIMES.
WRITE YOUR TARGET NUMBER.



HIT [=] 7 MORE TIMES.
WRITE YOUR TARGET NUMBER.



BONUS: How many times did you hit [=] altogether to get your winning number?

_____

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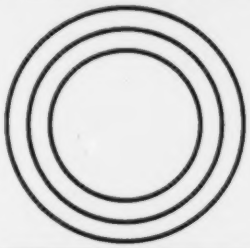
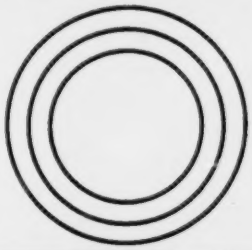
HIT THE TARGET, FIND THE WINNING NUMBER - 2ND

START: PRESS [78] [+] [1]

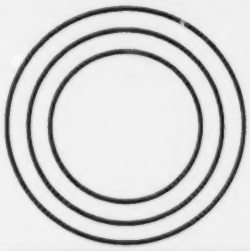
HIT [=] 10 TIMES.
WRITE YOUR TARGET NUMBER.



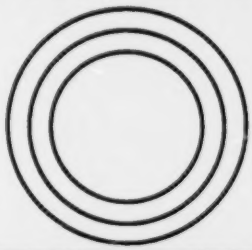
HIT [=] 23 MORE TIMES.
WRITE YOUR TARGET NUMBER.



HIT [=] 17 MORE TIMES.
WRITE YOUR TARGET NUMBER.

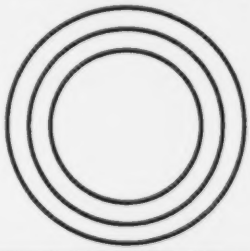


HIT [=] 6 MORE TIMES.
WRITE YOUR TARGET NUMBER.

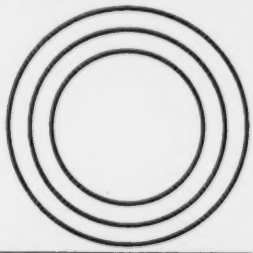


WINNING NUMBER

HIT [=] 14 MORE TIMES.
WRITE YOUR TARGET NUMBER.



HIT [=] 14 MORE TIMES.
WRITE YOUR TARGET NUMBER.



BONUS: How many times did you hit [=] altogether to get your winning number?

_____

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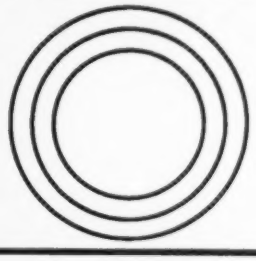
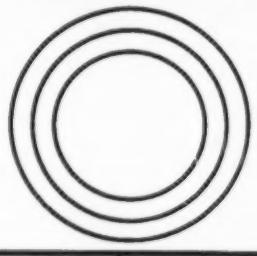
HIT THE TARGET, FIND THE WINNING NUMBER

START: PRESS [ ] [+] [ ]

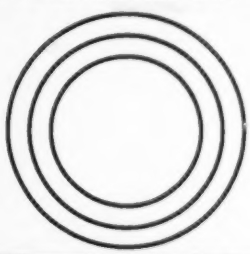
HIT [=] _____TIMES.
WRITE YOUR TARGET NUMBER.



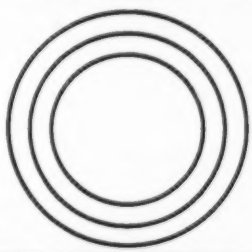
HIT [=] _____MORE TIMES.
WRITE YOUR TARGET NUMBER.



HIT [=] _____MORE TIMES.
WRITE YOUR TARGET NUMBER.

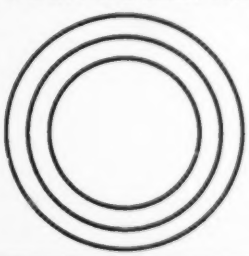


HIT [=] _____MORE TIMES.
WRITE YOUR TARGET NUMBER.

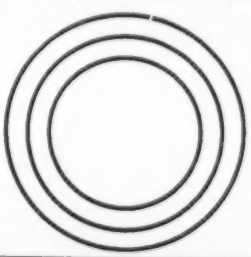


WINNING NUMBER

HIT [=] _____MORE TIMES.
WRITE YOUR TARGET NUMBER.



HIT [=] _____MORE TIMES.
WRITE YOUR TARGET NUMBER.



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FIND YOUR SEAT

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

SKILL: Exploring the calculator: Use the constant feature to count backwards.

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

SUGGESTED TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator or calculator transparency
- Calculator for each student
- Find Your Seat Number Record Sheet (Kdgn, 1st or 2nd)
- Find Your Seat Number Record Sheet - overhead transparency (Kdgn, First or Second)
- Find Your Seat Number Record Sheet - Extension Activity (Kdgn, 1st/2nd)
- Snack: popcorn, dry cereal, peanuts, etc.
- Napkin or paper towel for each student

VOCABULARY: Constant, symbol

PREREQUISITE SKILLS: Completion of Lesson 5

LESSON

- **DIRECTED INSTRUCTION:**
  1. Preparation:
     - Put a container of popcorn or dry cereal on each table.
     - Students need clean hands.
     - Each student needs to count out 15 pieces of popcorn or dry cereal and place on the napkin.

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2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator to each student and place the overhead calculator on the projector.	How many pieces of popcorn do you have?	15	Enter 15 into the calculator.
	If you eat one piece of popcorn how many do you think will be left?	14	Eat one piece of popcorn.
Ask these questions to help students discover a method to use the constant feature to show that we took one away.	How can we use the calculator to show that we took one away?	Let students brain-storm ideas.	
	• What keys did we use in our last lesson to count?	[+] [1] [=] [=]	
	• What happened each time we pressed [=]?	The number on the display got bigger by one.	
	• What happened to our number when we ate a piece of popcorn?	The number got smaller by one.	
	• What key do you think we need to use to make a number get smaller?	[-]	Press [-]
	Which number tells how much popcorn we ate?	one	Press [1] and then [=] to see the number that tells us how much popcorn is left. (14)

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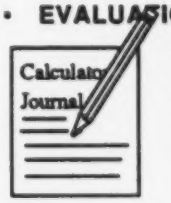
3. As students eat the rest of their pieces of popcorn, follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Each time the students eat one piece of popcorn, have them press [=] on their calculator and say the number that is on their display. Record each number on the chalkboard. 15 14 13 12 etc. ↓ 0			
Have students read the numbers on the chalkboard starting with 15. Ask these questions to help them discover the sequence of counting backwards by one.	How many pieces of popcorn did we start with?	15	
	How many pieces of popcorn were left on your napkin after we finished eating?	0	
	What was different about the way we counted today?	We counted backwards by one.	
	How did we use the [=] to count backwards by ones?	• Enter [15] • Press [-] • Press [1] • Press [=] • Continue pressing [=] until [0] appears on the display.	

- **GUIDED PRACTICE:**
  4. Use the [=] to count backwards by one starting with 50 and ending with zero. (Have Kdgn students read each number orally. First and Second graders can read the numbers silently.)
  5. Have students complete the Find Your Seat Record Sheet. (Kdgn, 1st or 2nd.) Use the overhead transparency of the record sheet to model the correct procedure for this activity, then have students work independently or in pairs. While working in pairs, one can operate the calculator and the other can record.
- **INDEPENDENT PRACTICE:**
  6. Use the blank Find Your Seat Record Sheet - Extension Activity.
- **EVALUATION:**



Ask students how they could use the calculator to count backwards by 2, 3, etc. See if they can come up with a system to make this discovery. (To count backwards from 20 by 2, press 20 [-] 2 [=] [=], etc.)

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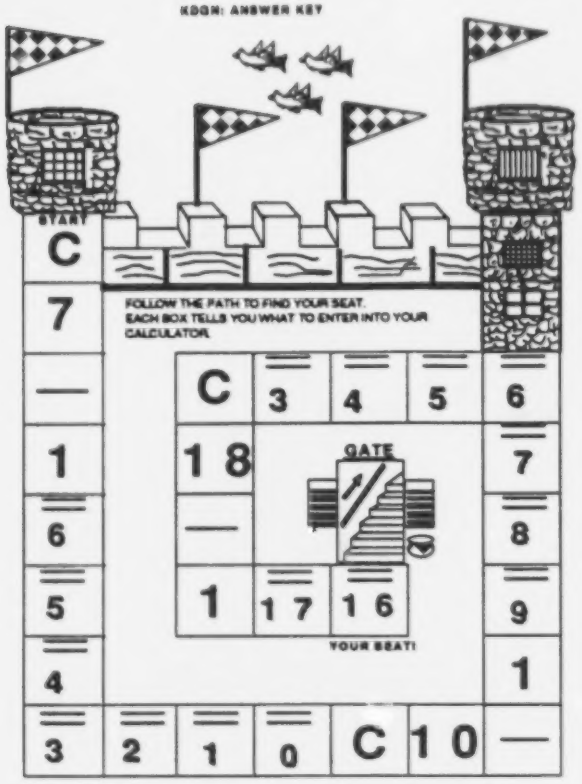
KDGN: ANSWER KEY



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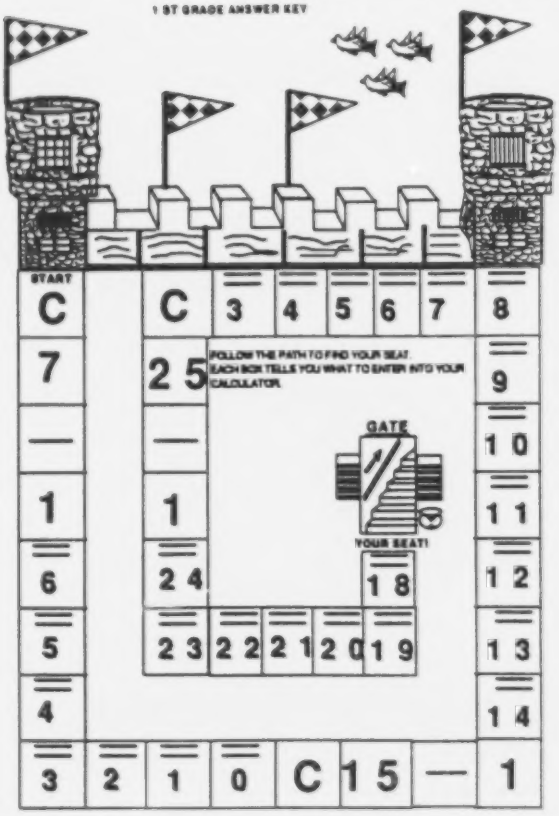
1 ST GRADE ANSWER KEY



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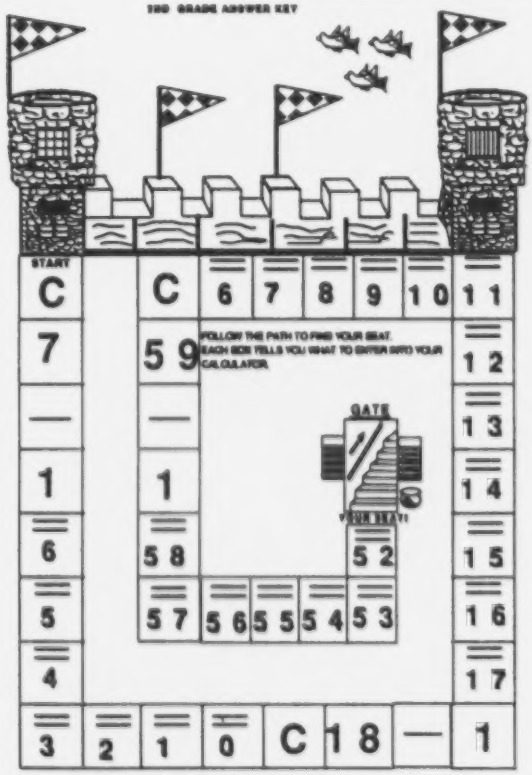
2ND GRADE ANSWER KEY



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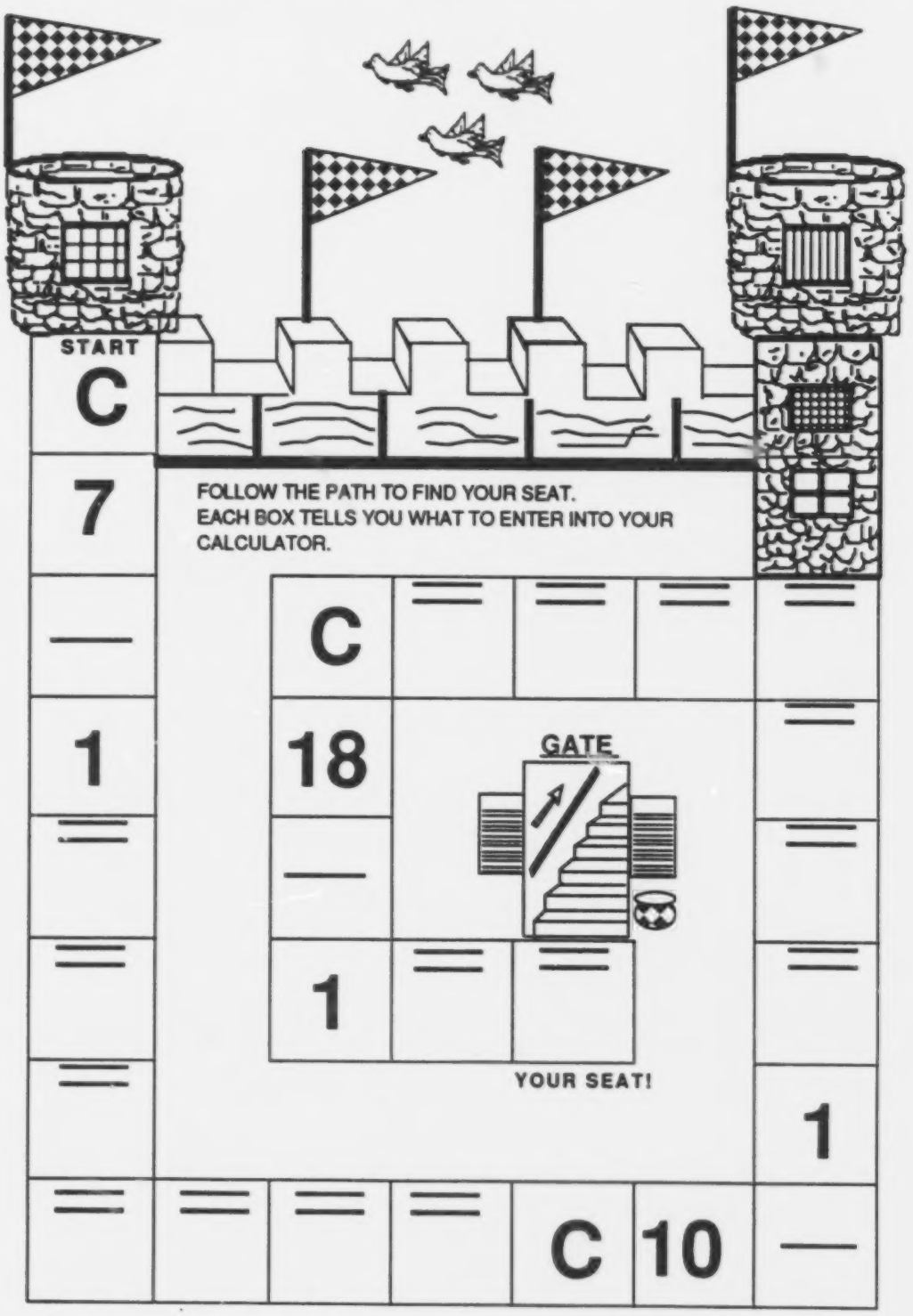
FIND YOUR SEAT RECORD SHEET - KDGN



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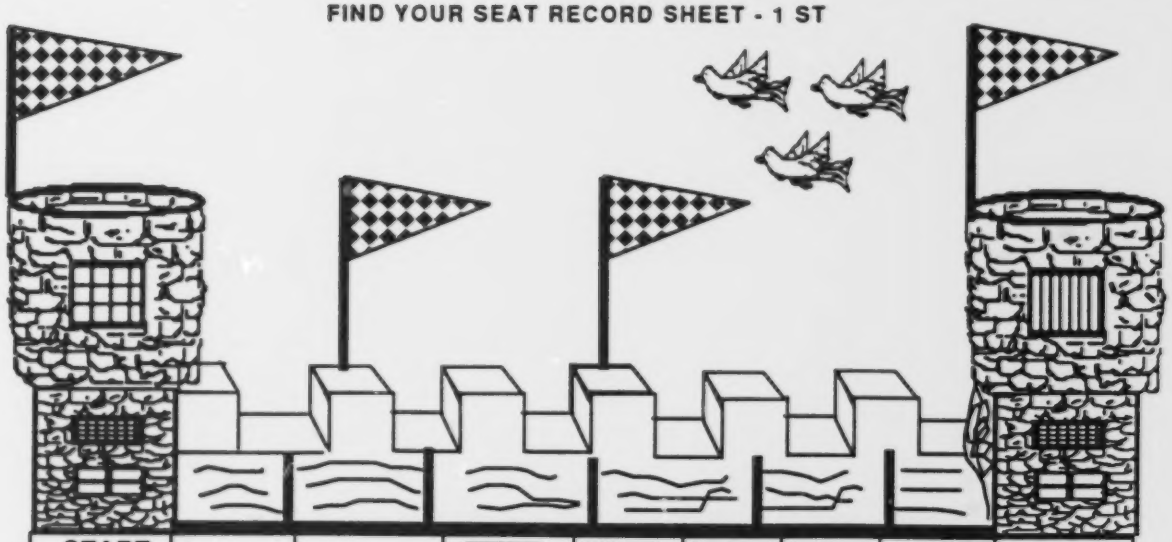
FIND YOUR SEAT RECORD SHEET - 1 ST



START C	C						
7	25	FOLLOW THE PATH TO FIND YOUR SEAT. EACH BOX TELLS YOU WHAT TO ENTER INTO YOUR CALCULATOR.					
—	—						
1	1						
					C	15	— 1

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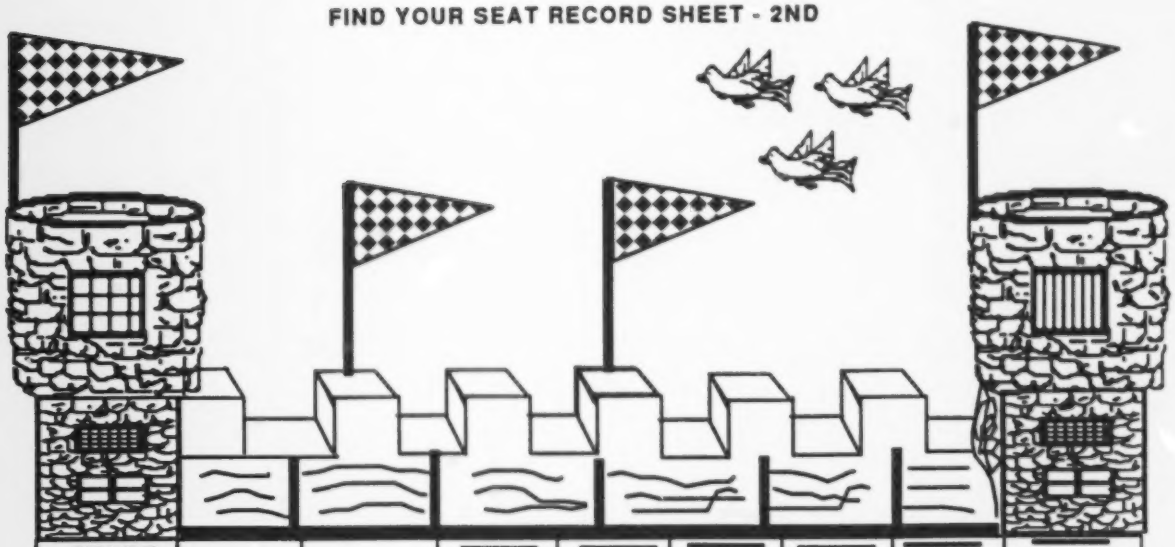
FIND YOUR SEAT RECORD SHEET - 2ND



START

C

7

—

1

C

59

—

1

FOLLOW THE PATH TO FIND YOUR SEAT.
EACH BOX TELLS YOU WHAT TO ENTER INTO YOUR CALCULATOR.

C 18 — 1

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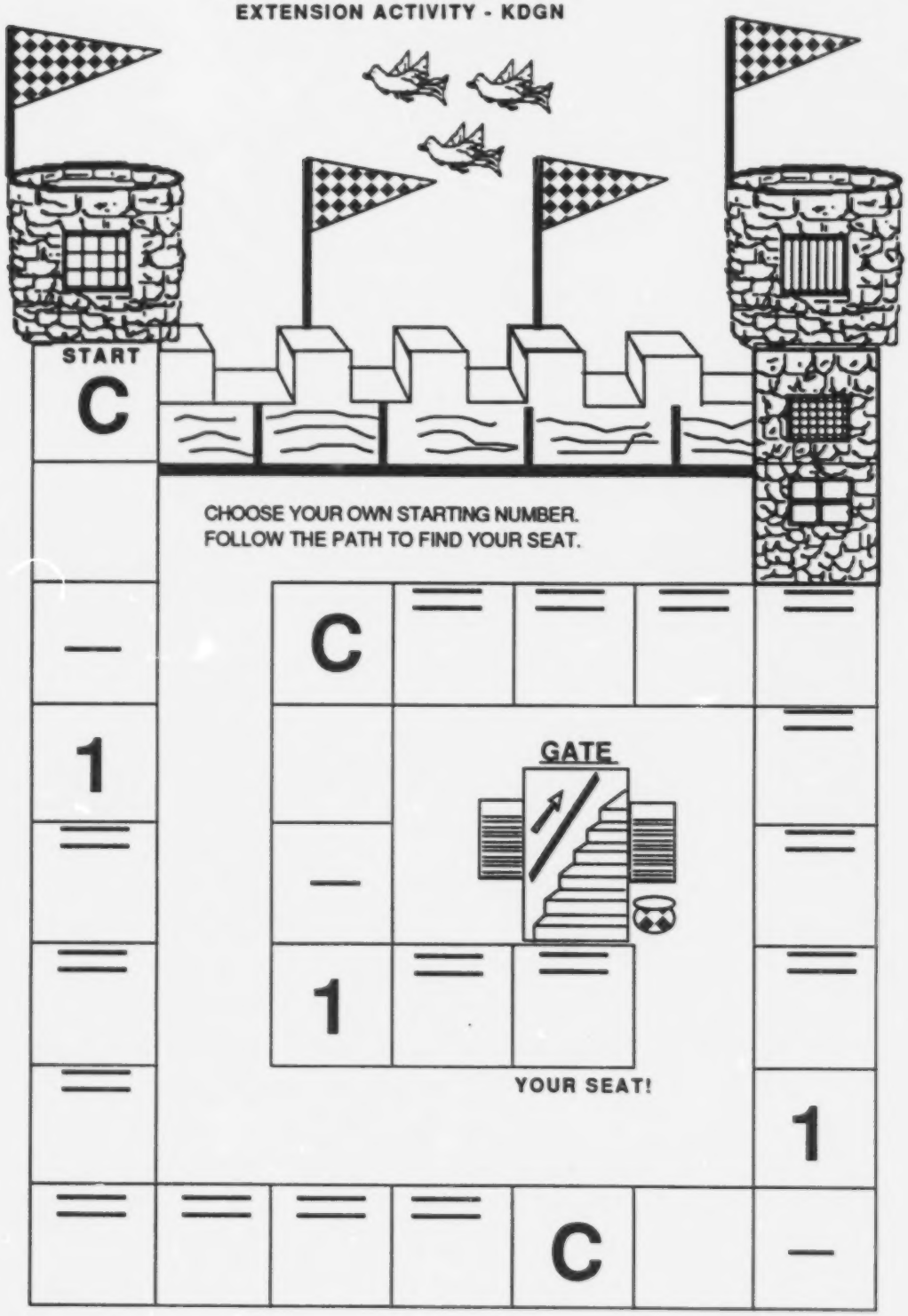
FIND YOUR SEAT RECORD SHEET
EXTENSION ACTIVITY - KDGN



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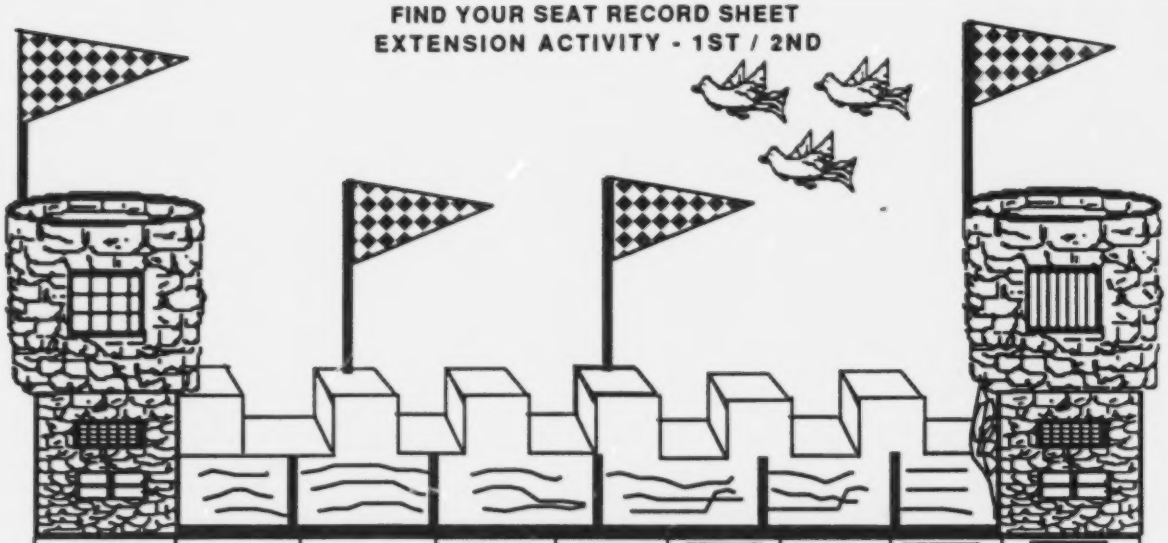
FIND YOUR SEAT RECORD SHEET
EXTENSION ACTIVITY - 1ST / 2ND



START

C

C

CHOOSE YOUR OWN STARTING NUMBER.
FOLLOW THE PATH TO FIND YOUR SEAT.

GATE

YOUR SEAT!

C

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GRAPH IT

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

SKILL: Exploring the calculator: Learn how to compute sums.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator
- Calculator for each student
- What Age Would You Like to Be? Record Sheet (optional)
- Pencil

VOCABULARY: Addition, Add (+), equal [=], sum, addends

PREREQUISITE SKILLS: Concept of addition, completed Lessons 1 - 6

LESSON

- **DIRECTED INSTRUCTION:**

  In this lesson a graph will be used as a concrete experience for teaching students to compute sums on the calculator.

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1. Follow these steps to complete the graph:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	Would you rather be younger, older or the same as you are?	Students can discuss the question.	
Make a real, picture, or symbolic class graph to record responses. (see sample) *OPTIONAL: Use the graph provided so that students can have their own copy.			
Ask these discussion questions to interpret the graph.	What does the graph tell us?	• How many want to be younger. • How many want to be older. • Accept all other reasonable answers.	
	How can we find out how many people want to be a different age than they are?	Add the numbers in the younger column and the older column.	
Distribute a calculator to each student and place the overhead calculator on the projector.			
Record on the chalkboard the number represented in the younger column and the number represented in the older column.	How can we use our calculator to find out how many people want to be a different age?	• Enter the number in the younger column. • Press [+] • Then enter the number in the older column. • Press [=]	Use the calculator to find the answer as the teacher demonstrates steps on the overhead.
Follow the same procedure to answer additional questions.	How can we use our calculator to find out how many don't want to be older?	Add the numbers in the "younger" column and the "same as you are" column.	Use the calculator to find the answers.
	How can we use our calculator to find out how many people don't want to be younger?	Add the numbers in the "older" column and the "same as you are" column.	

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• Solutions:

1. **How many people want to be a different age?**

☐		☐		☐		☐		☐
# of younger		[+]		# of older		[=]		# who want to be different

2. **How many people don't want to be older?**

☐		☐		☐		☐		☐
# of younger		[+]		# of same as you are		[=]		# who don't want to be older

3. **How many people don't want to be younger?**

☐		☐		☐		☐		☐
# of older		[+]		# of same as you are		[=]		# who don't want to be younger

Sample graph:
What age would you like to be?

Younger	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Older	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Same as you are	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺

*2. Follow the same procedure to give students additional concrete experiences to provide awareness of the concept, vocabulary and symbols for addition, as needed.

3. Students can experiment computing sums on the calculator using 2 or 3 addends.

• **EVALUATION:**

- Use your calculator to solve this problem:
  Example:
  There were 79 children at the park. After 26 more children arrived, how many were there in all?
- Have students explain how they used the calculator to compute the sum.
  (Enter 79 [+] 26 [=] 105.)
- How did we use the calculator to add more than two numbers (addends)?
  (We used the [+] key more than once.)
- Ask these questions to help students recognize when it's reasonable to use the calculator for addition:
  Would you use the calculator to find the sum for 1 + 1? (no)
  Would you use the calculator to find the sum of 74 + 98? (yes)

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- What is addition?

  Make a network of all the words you can think of for addition.

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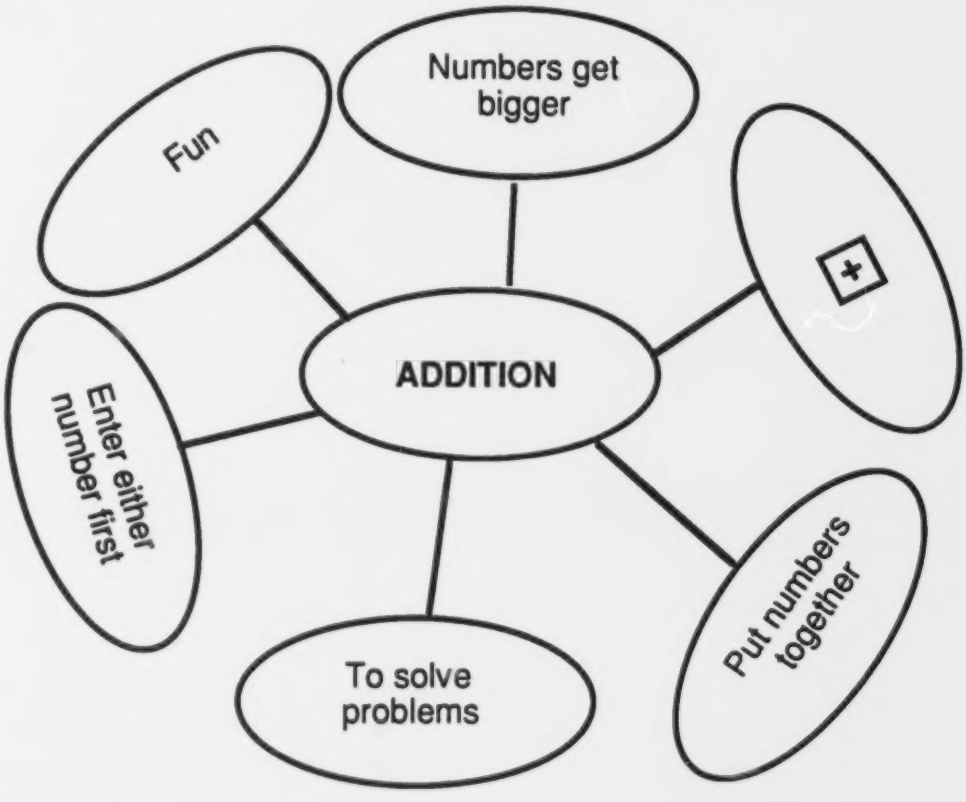
Sample



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WHAT AGE WOULD YOU LIKE TO BE?

Directions: Record the results from your class graph.
Show how you used the calculator to find the solution to each question.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Younger																					
Older																					
Same as you are																					

1. How many people want to be a different age? _____

2. How many people don't want to be older? _____

3. How many people don't want to be younger? _____

4. How many people are on this graph? _____

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CEREAL SURVEY

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

SKILL: Exploring the calculator: Learn how to compute differences on the calculator.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator
- Calculator for each student
- Cereal Survey Record Sheet (optional)
- Pencil

VOCABULARY: Subtraction, Subtract [-], equal [=], difference

PREREQUISITE SKILLS: Concept of subtraction, completed Lessons 1 - 7

LESSON

- **DIRECTED INSTRUCTION:**

In this lesson, a survey will be used as a concrete experience for teaching students to compute differences on the calculator. (You may want to discuss the purpose of surveys in our daily lives.)

SUGGESTED CLASSROOM MANAGEMENT TECHNIQUES:

- Choose 2 students to be the statisticians: one will count the students and one will record the results.
- Have students stand if their answer to a question is "yes".

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1. Follow these steps to complete the survey:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Ask these 3 questions to collect data for the cereal survey.	• Do you like hot cereal? • Do you like frosted cereal? • Do you like fruit in your cereal?	Students stand if their answer is yes.	Surveyors count and record results on the chalkboard. * Record only the "yes" answers at this time. yes 15 no
Ask these discussion questions to interpret the survey.	• What does the survey tell us?	• How many people like hot cereal? • How many people like frosted cereal? • Accept all other reasonable answers.	
	• How can we find out how many people did not like hot cereal?	Take the total number of people in the survey and subtract the "yes" responses. • The teacher may need to help students discover that they should start with the total number of people in the survey.	
Distribute a calculator to each student and place the overhead calculator on the projector.	How can we use our calculator to find out how many people don't like hot cereal?	• Enter the total number of people surveyed. • Press [-] • Then enter the number of "yes" responses. • Press [=]	Use the calculator to find the answer as the teacher demonstrates steps on the overhead.
Follow the same procedure to complete the survey.	• How can we use our calculator to find out how many people don't like frosted cereal? • How can we use our calculator to find out how many people don't like fruit in their cereal?	Take the total number surveyed and subtract the number of "yes" responses.	Use the calculator to find the answers.

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* Solutions:

1. **How many people don't like hot cereal?**

☐	☐	☐	☐	☐
total # of people surveyed	[-]	# of "yes" responses	[=]	# of "no" responses

2. **How many people don't like frosted cereal?**

☐	☐	☐	☐	☐
total # of people surveyed	[-]	# of "yes" responses	[=]	# of "no" responses

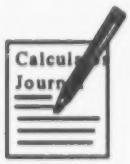
3. **How many people don't like fruit in their cereal?**

☐	☐	☐	☐	☐
total # of people surveyed	[-]	# of "yes" responses	[=]	# of "no" responses

2. Follow the same procedure to give students additional concrete experiences to provide awareness of concept, vocabulary and symbols for subtraction, as needed.

3. Students can use their calculator to have more experiences finding the difference between two numbers that have more than 2 digits.

- **EVALUATION:**
  - Use your calculator to solve this problem.
    Example:
    There were 42 people at the beach. Then 17 people went home.
    How many people were left?



  - Have students explain how they used the calculator to compute the difference. (Enter 42 [-] 17 [=] 25)
  - Ask these questions to help students recognize when to use the calculator for subtraction:
    Would you use the calculator to find the difference: 2-1? (no)
    Would you use the calculator to find the difference: 63-19? (yes)

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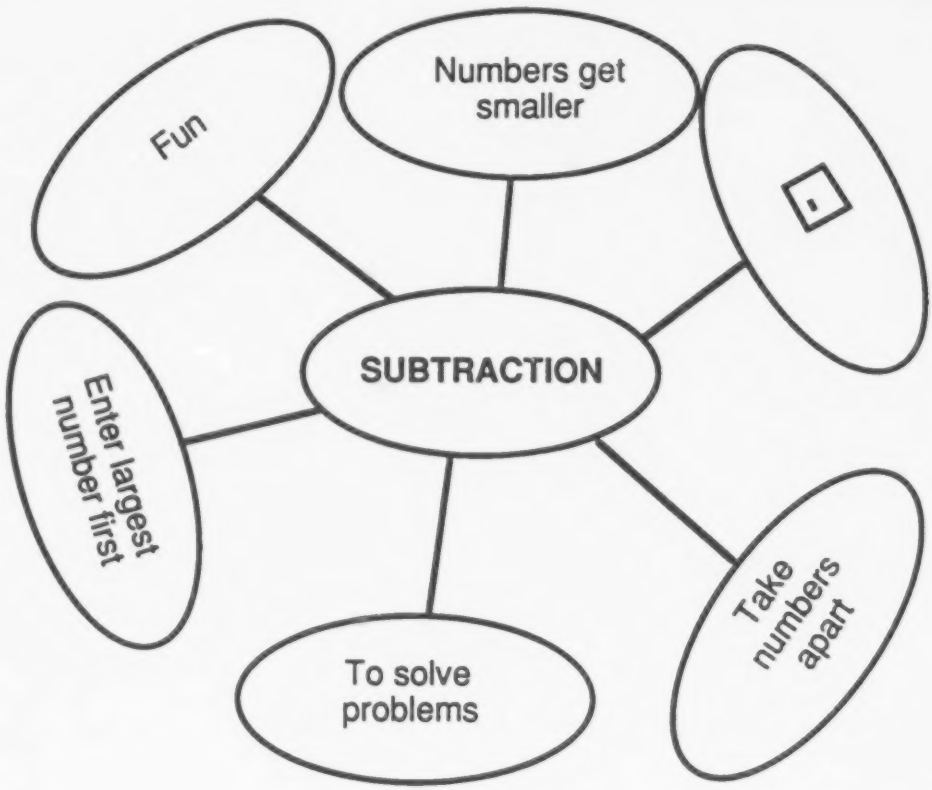
- What is subtraction?
  Make a network of all the words you can think of for subtraction.

Sample

Name _____



- **HOME ACTIVITY: (Real World Application - Extension)**
  If you were president of a cereal company, how would the Cereal Survey help you create a new cereal? Hint: Would it be hot, dry, frosted, etc.? Why? What would be a good name for it? Why?

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CEREAL SURVEY

NAME_____

DIRECTIONS: 1. Record the "yes" results from your class survey.
2. Use your calculator to find the "no" results.

Total number of people surveyed. ☐

1. Do you like hot cereal?	yes	
How many people do not like hot cereal?	no	
2. Do you like frosted cereal?	yes	
How many people do not like frosted cereal?	no	
3. Do you like fruit in your cereal?	yes	
How many people do not like fruit in their cereal?	no	

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LET'S PRETEND

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

SKILL: Exploring the Calculator: Choose the operation, addition [+] or subtraction [-], in a problem solving situation.

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Two half-hour sessions

MATERIALS:

- Overhead calculator
- Calculator for each student
- Swimming Pool Record Sheet
- Math Story Booklet Record Sheets
  - A Trip to David's Button Shop (Kdgn)
  - A Day at Bob's Bakery (First)
  - A Trip to Penny's Pizza Palace (Second)
- Scissors, stapler, pencil

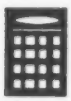
VOCABULARY: Add [+],Subtract [-], function key, operation

PREREQUISITE SKILLS: Understand the difference between the concept of addition and subtraction, completed Lessons 7 - 8

LESSON:

- **DIRECTED INSTRUCTION: SESSION 1**

1. Teacher says: "Today we are going to become actors and pretend that we are in line at the airport to purchase airplane tickets for our trip. (Ask the students where they would like to travel.) We are going to need to have our calculators with us."



2. Distribute a calculator to each student and place the overhead calculator on the projector.

3. Make a sign on the chalkboard that says:

AIRLINE TICKET COUNTER

4. Read this problem to your students:

> There were 7 people in line at the airport ticket counter.
> Two people bought tickets and left.
> Three more people got in line.
> Four people bought tickets and left.
> One more person got in line.
> The ticket counter closed after the next three people bought their tickets and left.
> How many people were there in line when the ticket counter closed?

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5. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	How can we solve this problem?	Students brainstorm ideas. •Act it out • Use objects • Use the calculator • Make a drawing • etc.	Choose one of the strategies to find the solution to the problem. For example: Act it out.
Then have students act out the problem: •Read the problem step-by-step as children act it out. • Each time the students act out a step in the problem, the rest of the class needs to choose the operation on their calculator: [+] or [-] that matches the action taken.			
Read: "There were 7 people in line."	What should we enter into our calculator?	7	Enter 7 into the calculator.
"Two people bought tickets and left."	How could you show this on your calculator? What operation would you use? Why?	• press [-] • then [2] We use subtraction because 2 people left.	Press [-] and then [2].
"3 more people got in line."	How could you show this on your calculator? What operation would you use? Why?	• Press [+] • Then [3] We use addition because more people came.	Press [+] and then [3].
"Four more people bought tickets and left."	What operation would you use? Why?	• press [-] • then [4] We use subtraction because the four people left.	Press [-] and then [4].
"One more person got in line."	What operation would you use? Why?	Addition because one person came.	Press [+] and then [1].
"The ticket counter closed after the next three people bought their tickets and left."	What operation do you need to use? Why?	Subtraction because the people left.	Press [-] and then [3]
			Press [=] and read the answer to the problem (2)
	How did we know when to press [+], [-] or [=]?	• Press [+] when people were added. • Press [-] when people left. • Press [=] to find the answer.	
We call [+], [-], [=] function keys.	What do you think function keys are used for?	To choose the operation and show the answer on the display.	

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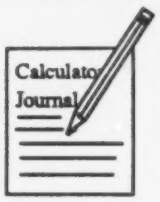
- **GUIDED PRACTICE:**

6. Have students work in pairs to write their own problem using the SWIMMING POOL RECORD SHEET. (Kdgn and First Grade teachers may want to do this as a total class activity.)
   - Students need to discuss the reasonableness of their choice and placement of numbers. Help them discover that you need to subtract a smaller number from a larger number or you will end up with a negative number for your answer.

7. Pairs of students can trade problems and solve them using their calculator.

- **EVALUATION:**



Teacher can present mathematical problems that require addition or subtraction and ask students to identify which key [+] or [-] to press on the calculator keyboard to solve the problem.

For example:

Thirty-two people were on the tour bus and nineteen got out. How many people were left?

- **DIRECTED INSTRUCTION: SESSION 2**

1. Follow these steps to review session 1:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Remind students that in Session One they took an imaginary trip.	How did we use the calculator to help us solve problems at the airport and the hotel swimming pool?	We used the [+],[-] and [=] keys.	
	Do you remember another name for these keys?	function keys.	
	How did we know when to press [+], [-] or [=]?	• Press [+] when people were added. • Press [-] when people left. • Press [=] to find the answer.	

2. Teacher says: "Today we are spending the day shopping at Calc Kid's Mall on our imaginary trip. You are going to make a Math Story Booklet and use your calculator to help Calc Kid choose when to press the [+], [-] or [=] to solve problems.

3. Have students follow these steps to complete the Math Story Booklet (Kdgn, First or Second)
   - Read the sentences.
   - Use the calculator to solve the problems.
   - Cut the pages apart to make a booklet.
   - Design a cover. (optional)
   - Staple the pages together.
   - Read the book to a friend or family member.

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ANSWER KEY FOR MATH STORY BOOKLET

David's Button Shop (Kdgn)

1	How many? [24] 2
[+] 16 How many? [40] 3	[-] 28 How many? [12] 4

12 buttons left.

Bob's Bakery (First)

18 How many? [18] 1	[+] 12 How many? [30] 2
[-] 9 How many? [21] 3	[+] 29 How many? [50] 4

50 bagels now.

Penny's Pizza Palace (Second)

How many? [48] 1	[-] 19 How many? [29] 2	[+] 29 How many? [82] 5	[-] 32 How many? [50] 6
[-] 12 How many? [17] 3	[+] 36 How many? [53] 4	[-] 12 How many? [38] 7	How many? [38] 8

- **EVALUATION:**
  See Evaluation Section for Session 1.

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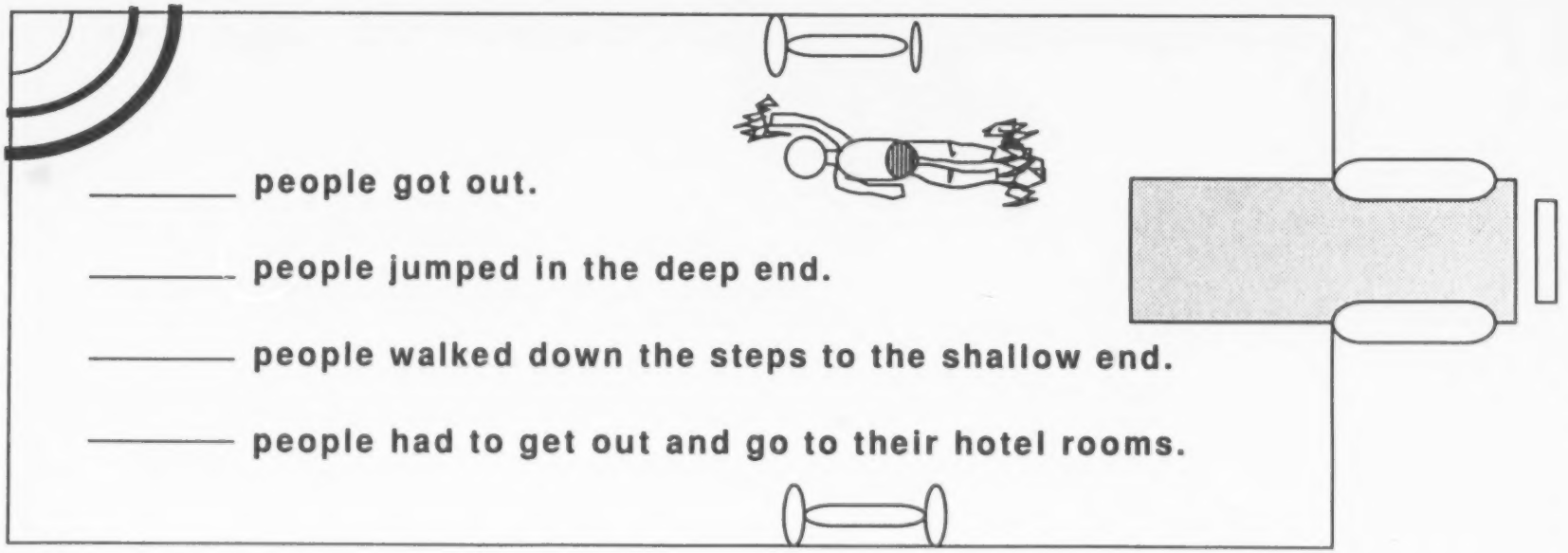
Name _____

THE SWIMMING POOL

Make up your own story problem by filling in the blanks with numbers of your choice.
Use your calculator to find the answer.

There were _____ people in the swimming pool at the hotel.



_____ people got out.

_____ people jumped in the deep end.

_____ people walked down the steps to the shallow end.

_____ people had to get out and go to their hotel rooms.

How many people are left in the pool now? _____

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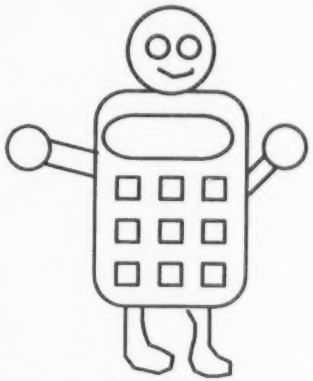
A Trip to David's Button Shop

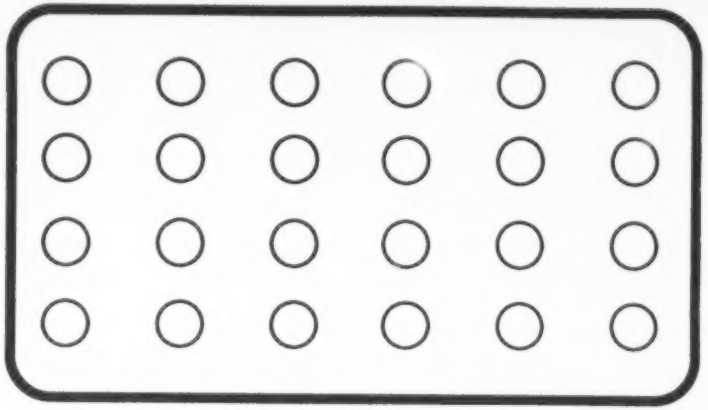


Let's go with Calc Kid to David's Button shop.

Use your calculator to help Calc Kid count buttons.

1

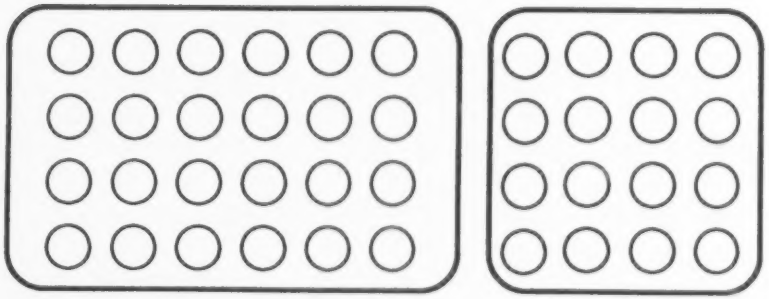
David made 24 buttons.



How many? _____

2

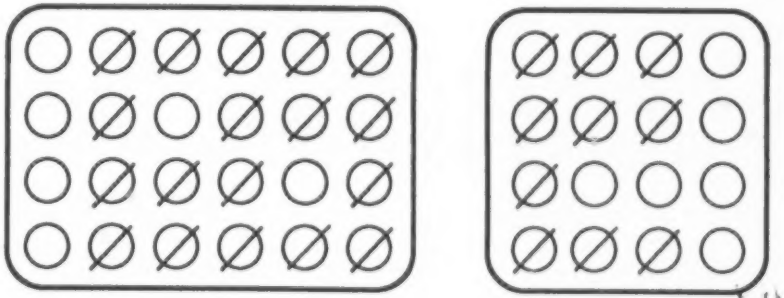
David made 16 more buttons.



How many does he have now? _____

3

David sold 28 buttons.



How many buttons are left? _____

4

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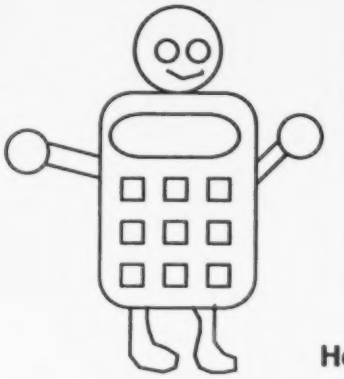
A Day at Bob's Bakery.



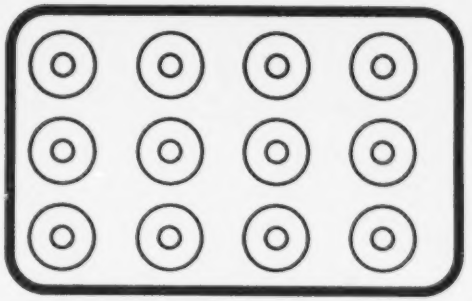
Calc Kid went to Bob's Bakery to visit for a day. When he arrived, Bob had made 18 bagels.

Use your calculator to help Calc Kid count bagels.

How many? _____

1

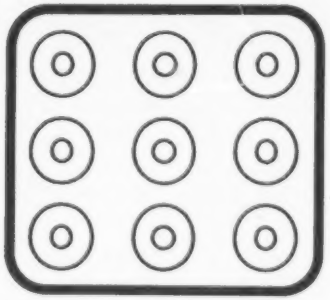
Bob baked 12 more bagels.



How many now? _____

2

Mr. Lawrence bought 9 bagels.



How many now? _____

3

Bob made 29 more bagels.

How many bagels does Bob have now?

_____

4

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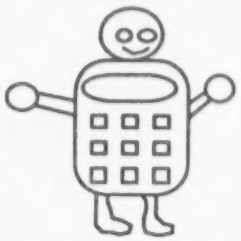
S1

S2

A Trip to Penny's Pizza Palace.

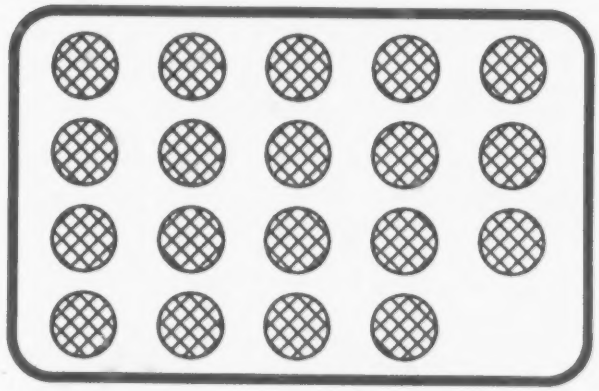
Calc Kid went to Penny's Pizza Palace to visit for a day. When he arrived, Penny had baked 48 pizzas.



Use your calculator to help Calc Kid count pizzas.

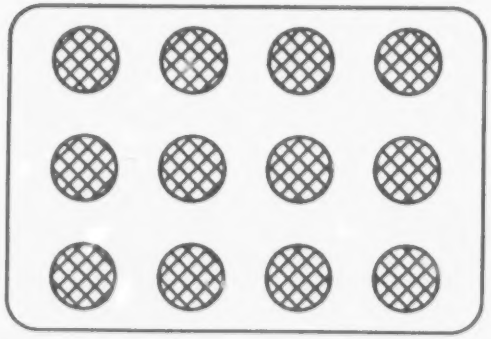
How many? _____ 1

Penny sold 19 pizzas to Mrs. Newman.



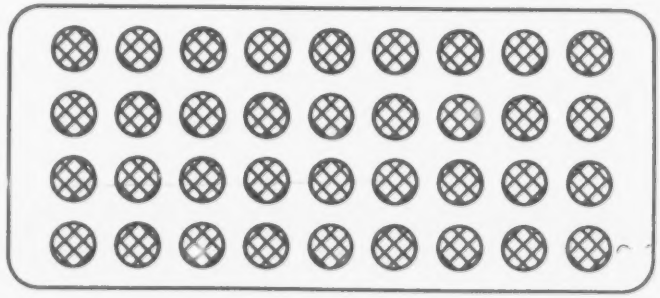
How many? _____ 2

Then Pat bought 12 pizzas.



How many now? _____ 3

Penny baked 36 more pizzas.



How many? _____ 4

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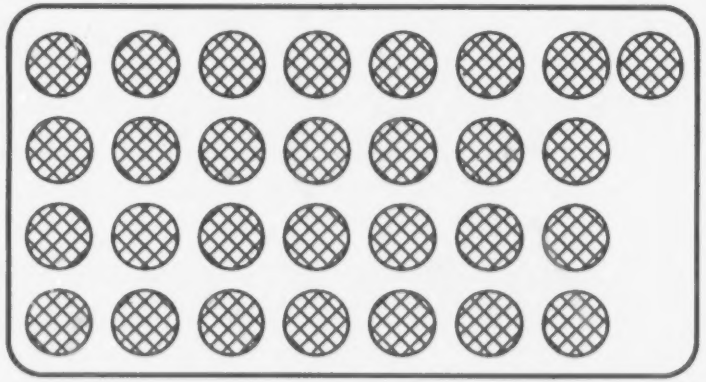
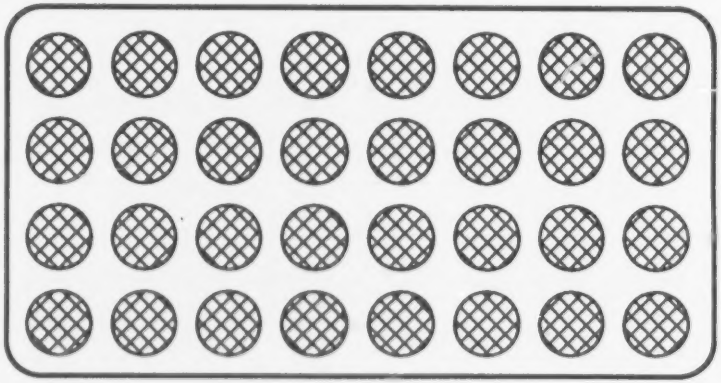
Penny baked 29 more pizzas.



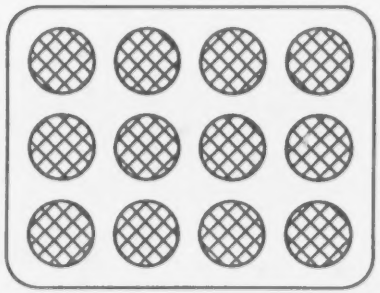
How many? _____ 5

Mr. Green purchased 32 pizzas for the school picnic.



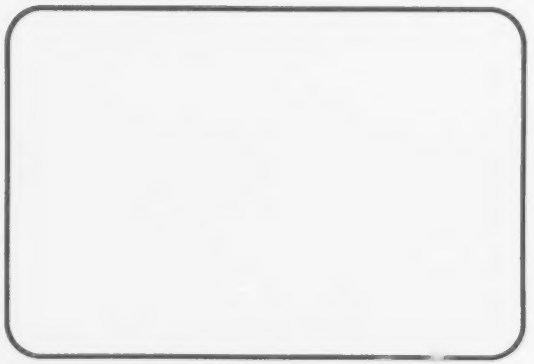
How many? _____ 6

Marea came in and bought 12 pizzas for a birthday party.



How many now? _____ 7

How many pizzas did Penny have left in her Pizza Palace?



_____ 8

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S5

S6

SHOW THE PARTS

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

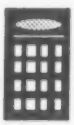
SKILL: Exploring the calculator: Locate, identify and define parts of the calculator for review.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: 20 minutes

MATERIALS:



- Overhead calculator or calculator transparency
- 1 pair of scissors per student
- Paste
- 1 box of crayons per student
- Show the Parts Record Sheet
- Calculator Review Post Test (Kdgn, 1st, 2nd)

VOCABULARY: Review the function keys and number keys.

PREREQUISITE SKILLS: Completion of Lessons 1 - 9.

LESSON

- **DIRECTED INSTRUCTION:**
  1. Teacher says: "Let's review the parts of the calculator we have learned: (Use overhead calculator or calculator transparency)
     1) Display
     2) Solar/light panel
     3) On/clear key
     4) Number keys
     5) [=]
     6) [+]
     7) [-]

     * Use the glossary to help locate and define each part of the calculator.

  2. For more practice in locating parts of the calculator, use the Show the Parts Record Sheet.(Kdgn, 1st/2nd)

- **EVALUATION:**
  Administer Calculator Review Post Test (Kdgn, 1st, 2nd)

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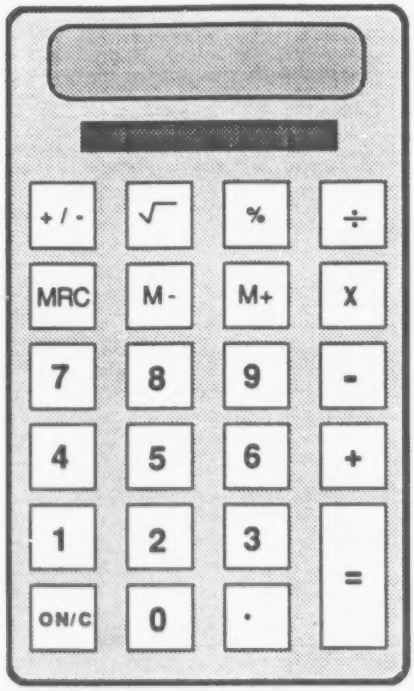
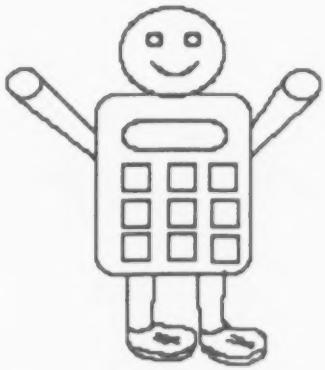
87

Name _____ Date _____

SHOW THE PARTS RECORD SHEET - KDGN





CALCULATOR		Color the Part
	Solar panel	red
ON/C	Key	yellow
	Display	blue
	Keys	green
=	Key	purple
+	Key	orange
−	Key	brown

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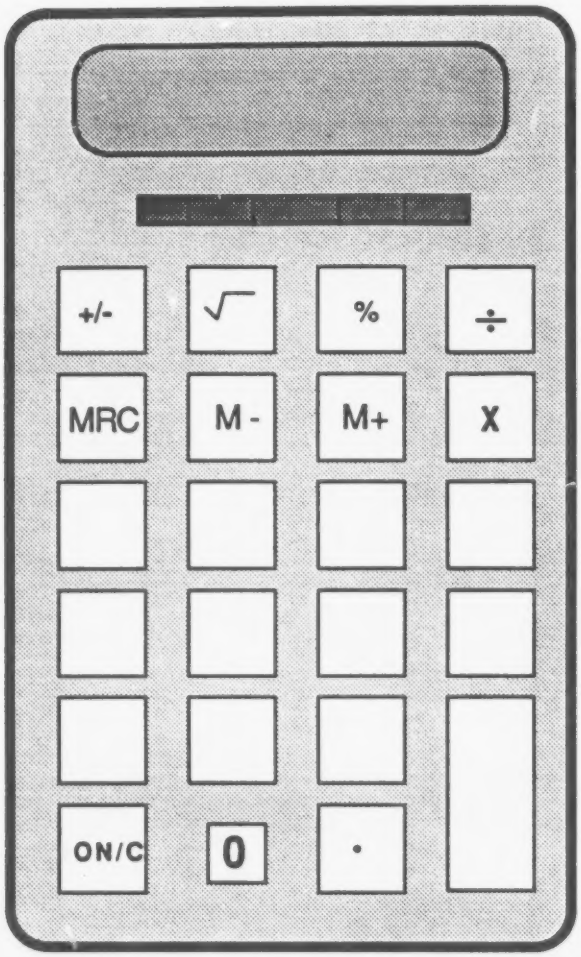
Name _____ Date _____

Calculator



1. How many number keys are there?
2. How many function keys are there?
3. Color the display red.
4. Color the ON/C key yello
5. Color the number keys blue
6. Cut out the function keys and number keys and paste them in the right order on the calculator.

5	3	9	7	1	4
6	2	8	+	−	=

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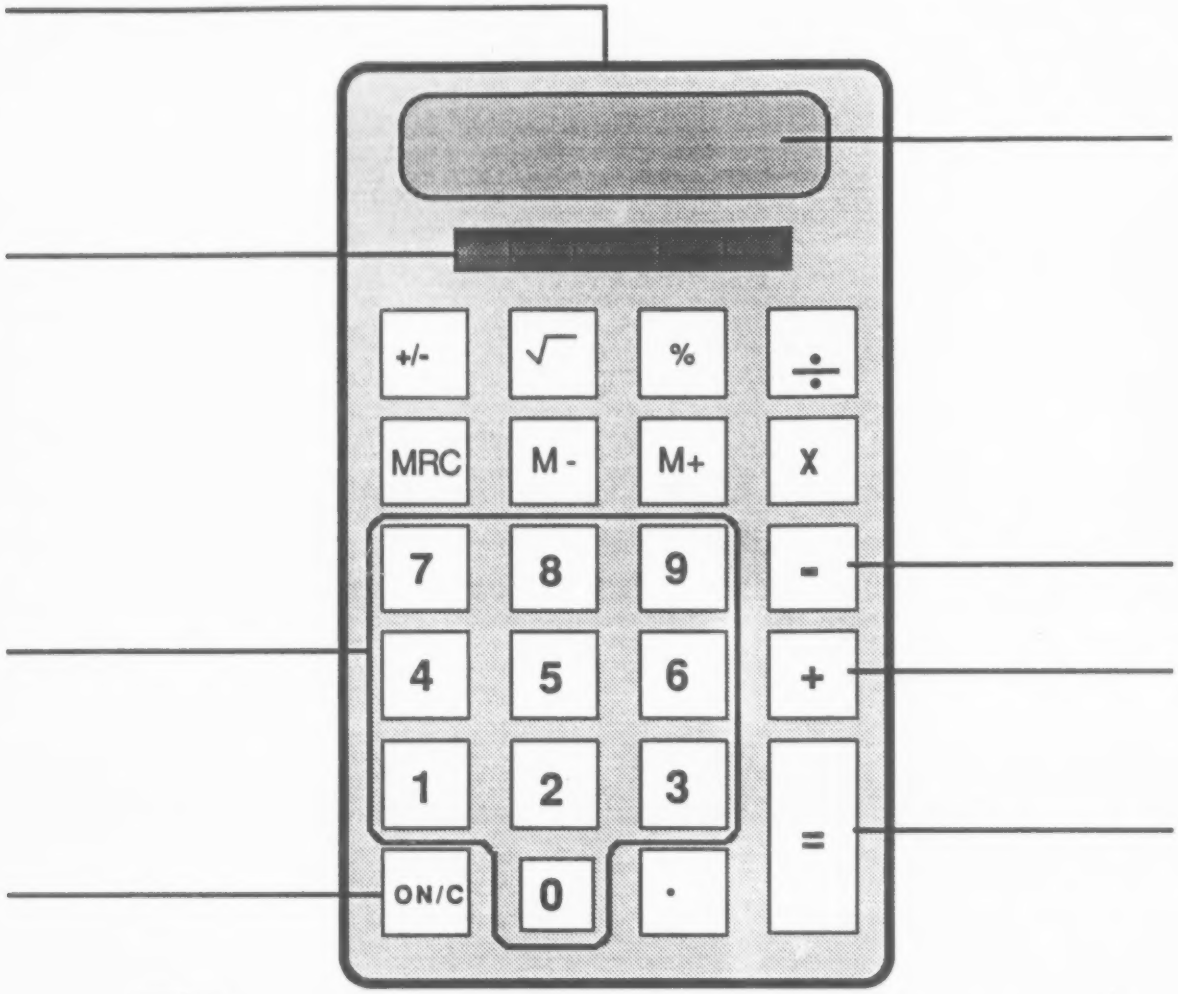
NAME _____

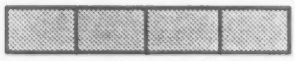
CALCULATOR REVIEW POST TEST - KDGN

Find the key.
Write the letter on the line.

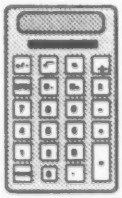


A.

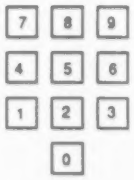
B.

C. 

D.

E. 

F.

G. 

H.

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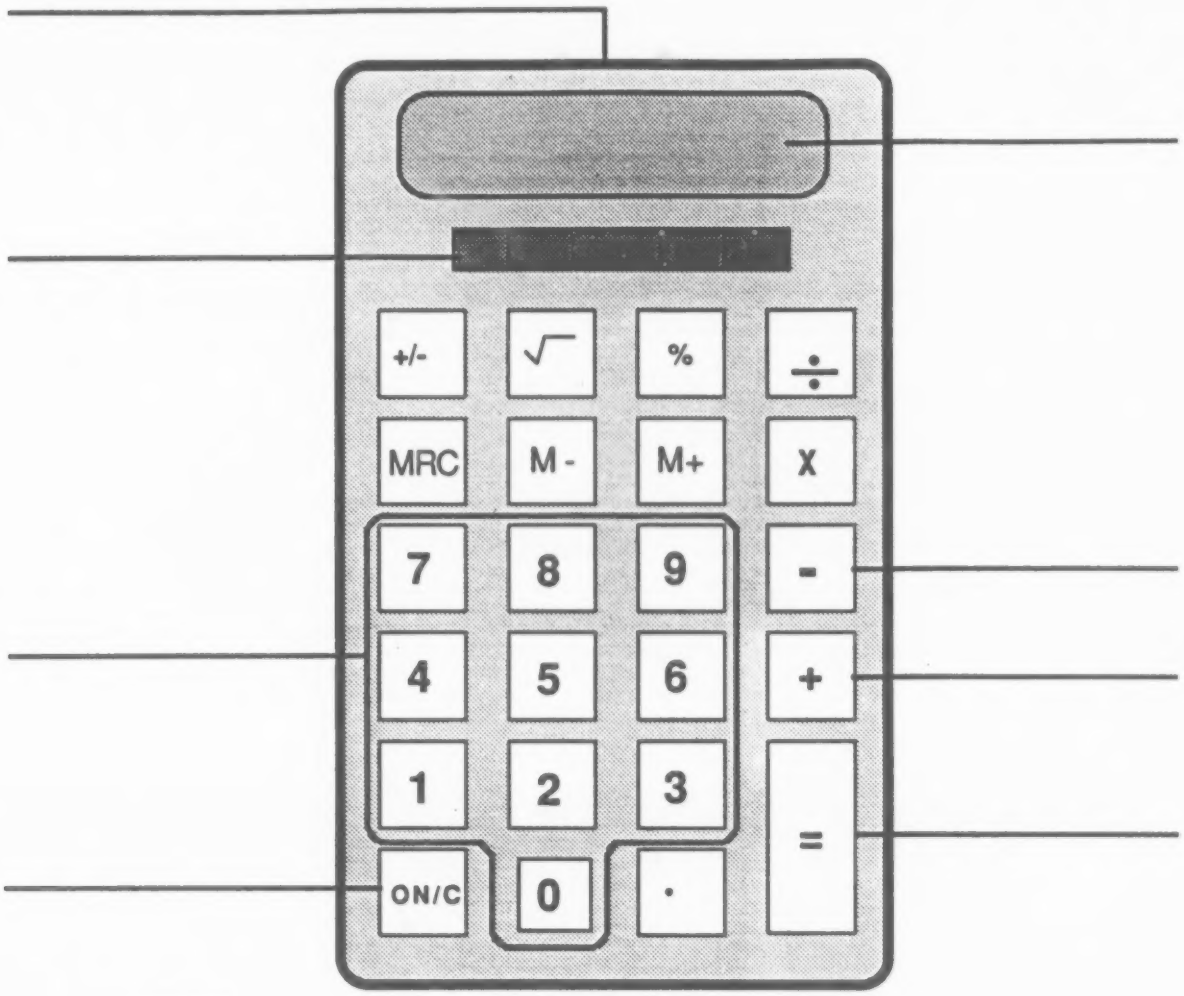
NAME _____

CALCULATOR REVIEW POST TEST - 1st

Find the key.
Write the letter on the line.



A. = Equal key/ constant feature

B. + Add/Plus key

C. Solar light panel

D. Display

E. Calculator

F. ON/C On/clear key

G. Number keys

H. − Subtract key

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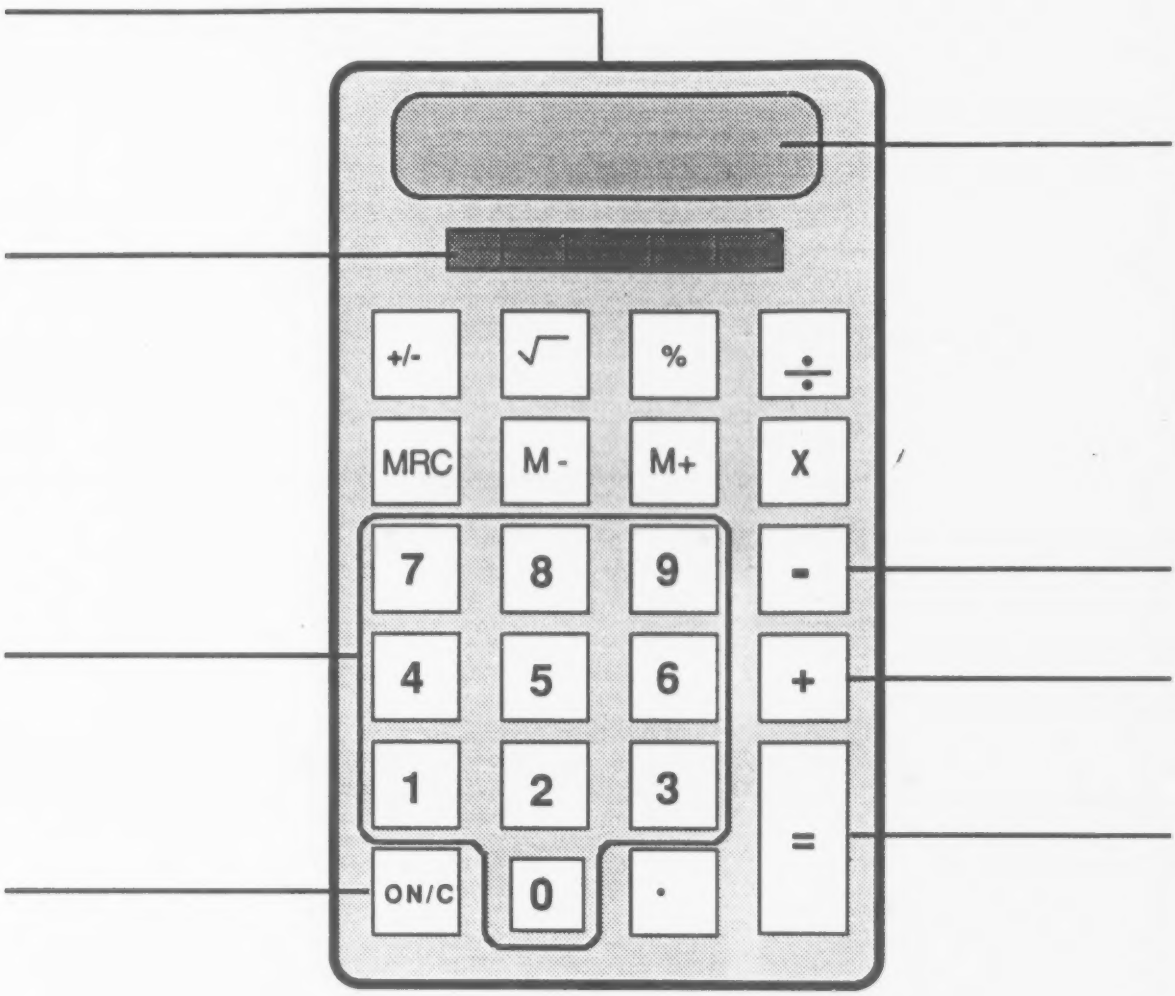
NAME_____

CALCULATOR REVIEW POST TEST - 2nd

Find the key.
Write the letter on the line.



A. Equal key/constant feature

B. Add/Plus key

C. Solar light panel

D. Display

E. Calculator

F. On/clear key

G. Number keys

H. Subtract key

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THE CARNIVAL PRIZE BOOTH

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

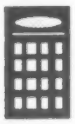
SKILL: Exploring the Calculator: Review calculator awareness skills and vocabulary in problem solving situations. (Emphasizing: counting and sorting)

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Half-hour

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each pair of students
- Win a Prize sheet (Kdgn, 1st or 2nd)
  Save this sheet for Lesson 12
- Win a Prize sheet transparency (Kdgn, 1st or 2nd)
- Prize Booth Inventory Record Sheet (Kdgn, 1st or 2nd)

VOCABULARY: No new vocabulary is introduced; however, you may want to reinforce these terms:
Calculator, keys, display, on/clear key, keyboard, digits, enter, constant feature, symbol, equal, add, subtract

PREREQUISITE SKILLS: Completion of Lessons 1 - 10

LESSON

- **DIRECTED INSTRUCTION:**

1. Teacher says: "Let's pretend that we're having a school carnival and our class is in charge of the prize booth. In our prize booth there are toys, school supplies, and clothes." (Second grade prize booth has a fourth category: food.)
   "The first thing we have to do is take inventory. That means we need to count how many prizes we have in our booth. We also need to count how many prizes are toys, school supplies, or things to wear."

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2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Place the Win a Prize transparency (Kdgn, First or Second) and the overhead calculator or calculator transparency on the projector.	How could we use our calculator to help us count all the prizes?	[+], [1], [=], [=], etc.	
Choose a student to point to the prizes on the overhead projector as another student models how to use the [=] to count the prizes.			
Each pair of students needs one calculator, a Win a Prize Sheet and two Prize Booth Inventory Record Sheets. (Kdgn., First or Second).			Work in pairs to complete Part A of the Inventory Record Sheet following these steps: • One student can point to each prize on the Win A Prize Sheet as the other student counts using the [=]. • Then switch responsibilities and check to see if the same answer appears on the display. • Try other ways to count the prizes using the calculator: Count by twos, etc. • Record the results on the Prize Booth Inventory Record Sheet.
			Complete Part B following the same steps.* This time sort and count how many toys, school supplies and things to wear are in the Prize Booth.
			After recording results in Part B, add the total from each category to see if it matches the total in Part A.

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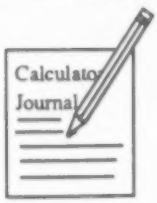
- **GUIDED PRACTICE:**
  3. Students can sort prizes by other categories:
     - Digits in the number of points for each prize.
     - Prizes over 100 points and under 100 points.
  - Students can graph their results.

- **EVALUATION:**



How did you use your calculator to help you take inventory?

Is there another way you could have taken inventory?

Answer Key

Kdgn
16 prizes in the Prize Booth

Things to wear: 5

Toys: 6

School supplies 5

Grade 1

25 prizes

Things to wear: .....7(or 8 if backpack is included)

Toys: 12

School supplies .....5(or 6 if backpack is included)

Grade 2

25 prizes

Things to wear: .....6(or 7 if backpack is included)

Toys: 9

School supplies .....5(or 6 if backpack is included)

Things to eat 4

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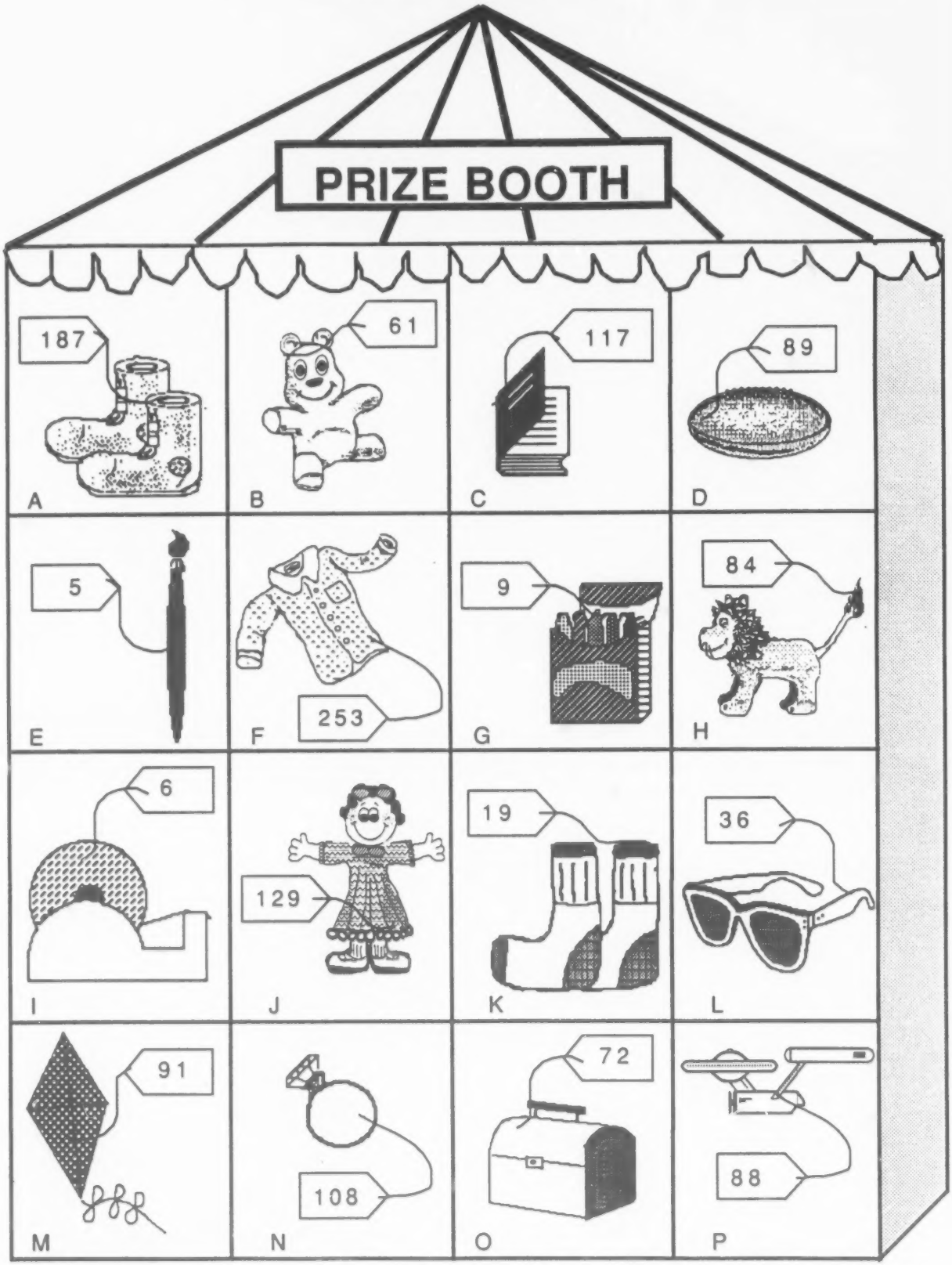
WIN A PRIZE

KDGN



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WIN A PRIZE

1ST

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WIN A PRIZE

2ND

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NAME _____

PRIZE BOOTH INVENTORY RECORD SHEET - (KDGN)

PART A

1. Count the number of prizes in the Prize Booth.
2. Circle the total number of prizes.

10	16	14

PART B

1. Circle the correct number.

Things to wear

1	5	10

Toys

6	3	7

School Supplies

4	2	5

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NAME _____

PRIZE BOOTH INVENTORY RECORD SHEET - (1st)

PART A

1. Count the number of prizes in the Prize Booth.
2. Write the correct number in the box.

PART B

Write the correct number of each item on the line.

There are _____things to wear.

There are _____ toys.

There are _____ school supplies.

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NAME_____

PRIZE BOOTH INVENTORY RECORD SHEET - (2nd)

PART A

1. Count the number of prizes in the Prize Booth.
2. Write the correct number in the box.

PART B

1. Count the number of prizes in your Prize Booth using your calculator.
2. Write the correct number of each item on the line.

There are _____things to wear.

There are _____ toys.

There are _____ school supplies.

There are _____things to eat.

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SPEND YOUR COUPONS

GRADE: K - 2

STRAND: CALCULATOR AWARENESS

SKILL: Exploring the Calculator: Review calculator awareness skills and vocabulary in problem solving situations. (Emphasizing: addition and subtraction.)

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator or calculator transparency
- Calculator for each student
- Win a Prize sheet transparency (Kdgn, 1st or 2nd) from Lesson 11
- Win a Prize sheet (Kdgn,1st or 2nd)from Lesson 11
- Spend Your Coupons Record Sheet (Kdgn, 1st or 2nd)
- Pencil

VOCABULARY: No new vocabulary is introduced; however, you may want to reinforce these terms:
Calculator, keys, display, on/clear key, keyboard, digits, enter, constant feature, symbol, equal, add, subtract

PREREQUISITE SKILLS: Completion of Lessons 1 - 11

LESSON

- **DIRECTED INSTRUCTION:**

1. Teacher says: "In our last lesson, we took an inventory of things that were in the prize booth and now we're ready to open up our booth for our pretend carnival. The children can earn coupons at the game booths and spend them at our prize booth. There are tags on the items to tell how many coupons are needed to buy the prizes."

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2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator to each student and place the overhead calculator on the projector to use with the Win a Prize transparency. (Kdgn, First or Second)	Mary came in and bought a teddy bear and a pair of sunglasses. How could we use the calculator to find out how many coupons she spent?	Use the [+].	
Choose a student to model how to use the [+] key to find out how many coupons Mary spent.			Follow the same steps using the calculator to find out how many coupons Mary spent: • Enter [61] (teddy bear) • Press [+] • Enter [36] (Sunglasses) • Press [=] • Display: 97
	Mary had 135 coupons and she spent 97 coupons to buy the teddy bear and the sunglasses. How could we use our calculator to find out how many coupons she had left?	Use the [-] key.	
Choose a student to model how to use the [-] key to find out how many coupons Mary will have left. * Review the reason for entering the larger number first when subtracting on the calculator.			Follow the same steps using the calculator to find out how many coupons Mary had left: • Enter [135] (Total coupons) • Press [-] • Enter [97] (Total spent) • Press [=] • Display: 38

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- **GUIDED PRACTICE:**

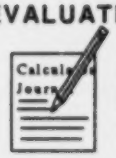
3. Follow these steps: **(Optional at the Kindergarten level)**

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	Mary had 38 coupons left so she decided to play some games to earn more coupons. She earned 82 more. How many coupons does she have now?	Use the calculator to find the sum. (38 + 82 = 120)	Explain how you used the calculator to find the answer.
	When she went back to the Prize Booth, she wanted to buy 3 more prizes. What 3 prizes could she buy?	Students can guess 3 prizes that Mary could buy with her 120 coupons.	
To prepare students to work independently to solve this problem ask these questions.	• What was the total number of coupons Mary had to spend?	120	Work in pairs using the calculator to find 3 prizes that Mary could buy with 120 coupons.
	• Could she buy a jacket, book and boots?	no	
	Why not?	A jacket alone costs 253 coupons and she only has 120 coupons.	
	How can you find 3 things that she can afford to buy?	Use the calculator to experiment with 3 different sets of numbers (from prize list) to get a sum of 120 or less.	
	Do you think it's possible to get more than one answer to this problem?	Yes	
Have students discuss their answers and explain how they used their calculator to find the 3 prizes.			

- **INDEPENDENT PRACTICE:**

4. Students can work in pairs to complete the Spend Your Coupons Record Sheet. (Kdgn., First or Second)

- **EVALUATION:**



How did you use your calculator to help you at the prize booth?
Did the calculator help you decide how to spend your coupons? (No, we have to make reasonable choices before we enter numbers and select function keys.)

- **HOME ACTIVITY:**

1. Students can make up their own math story problems about the prize booth.
2. Use newspaper ads to create story problems.

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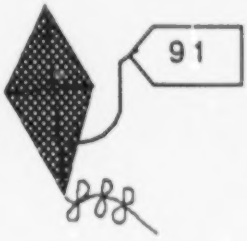
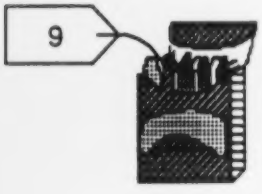
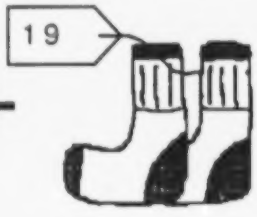
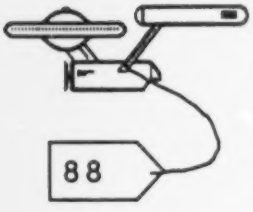
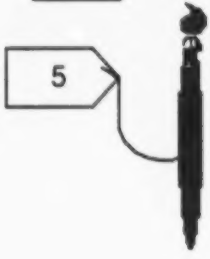
Name _____ and _____

SPEND YOUR COUPONS RECORD SHEET - KDGN

Directions: Use your calculator and the Win a Prize Sheet to solve the problems.

	You buy		How much did you spend? Circle your choice.		
1.		+ 	157	152	149
2		+ 	36	47	28
3		+	196	169	150
4		+ 	135	122	142
5		+	327	231	382

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Name _____ and _____

SPEND YOUR COUPONS RECORD SHEET - 1ST GRADE

Directions: Use your calculator and the Win a Prize Sheet to solve the problems.

1. You start with [234] coupons.

2. You buy the prize in boxes [B] and [N]

3. How much did you spend? [ ]

4. Now, you have [ ] left.

5. You earn [54] more coupons.

6. How many coupons do you have now? [ ]

---

1. Choose three items from the Prize Booth.

2. Write down the number of coupons needed for each prize in the boxes below.

3. Use your calculator to find the sum.

[ ]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	[ ]
+ [ ]	+ [ ]	+ [ ]	+ [ ]
[ ]	[ ]	[ ]	[ ]

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Name _____ and _____

SPEND YOUR COUPONS RECORD SHEET - 2ND GRADE

Directions: Use your calculator and the Win a Prize Sheet to solve the problems.

1. You start with [324] coupons.
2. You buy [ ] and [ ] (Choose two items from the Prize Booth.)
3. How much did you spend? [ ]
4. Now, you have [ ] left.
5. You earn [36] more coupons.
6. How many coupons do you have now? [ ]

How many ways can you spend your 324 coupons buying three (3) prizes?

Write the letter for each item in the box.

[ ] + [ ] + [ ] = [ ]

[ ] + [ ] + [ ] = [ ]

[ ] + [ ] + [ ] = [ ]

[ ] + [ ] + [ ] = [ ]

[ ] + [ ] + [ ] = [ ]

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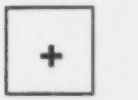
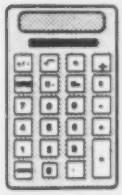
GLOSSARY OF CALCULATOR TERMS



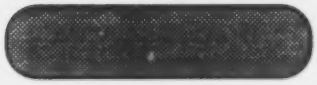
Add/Plus - A function Key used to tell the calculator to perform addition.



Calculator - A tool used to compute mathematical problems.

Constant Feature - Key on the calculator used to repeat a given function, such as addition.

Decimal Point - Key used to put a decimal point in a number.



Display - Large screen which shows the numbers which have been entered into the calculator.

Digit - Single symbol used to enter numbers.

Divide - A function key used to tell the calculator to perform division.

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GLOSSARY OF CALCULATOR TERMS

9 - 2 = 7

Difference - The answer we get when we subtract.

8

Eight Key - Digit used to represent eight objects.

• • • •
• • • •

=

Equal Key - Press this key to get the answer on the display.

5

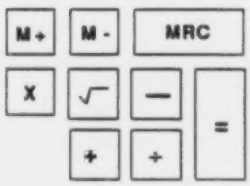
Five Key - Digit used to represent five objects.

• • •
• •

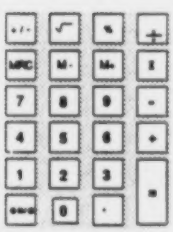
4

Four Key - Digit used to represent four objects.

• •
• •



Function Keys - Keys used to perform mathematical operations.



Keys - Press the keys to enter numbers or functions into the calculator.

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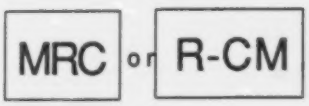
GLOSSARY OF CALCULATOR TERMS

Memory Plus Key - A key used to add the number in the display to the memory.

Memory Minus Key -A key used to subtract the number in the display from the memory.

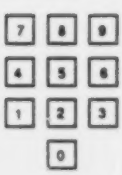


Memory Recall/Memory Clear Key - Press this key once to display the number stored in the memory. Press this key twice to clear the memory.

Multiply - Key used to tell the calculator to perform multiplication.

Nine Key - Digit used to represent nine objects.

• • • • •
• • • •



Number Keys - Keys used to enter numbers into the calculator.

On/Clear Key - A key that turns on the calculator. Often this key is used to clear the calculator display to read zero.

One Key - Digit used to represent one object.

•

Solar/Light Panel - Energy source from sun or light to make the calculator work.

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GLOSSARY OF CALCULATOR TERMS

Square Root- A function key used to tell the calculator to perform a square root.

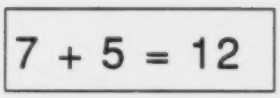
Subtract - Key used to tell the calculator to perform subtraction.

Six Key - Digit used to represent six objects.

• • •
• • •

Seven Key - Digit used to represent seven objects.

• • • •
• • •



Sum - The answer we get when we add.

Three Key - Digit used to represent three objects.

• • •

Two Key - Digit used to represent two objects.

• •

Zero Key - Digit used to represent no objects, or it may also be a place holder.

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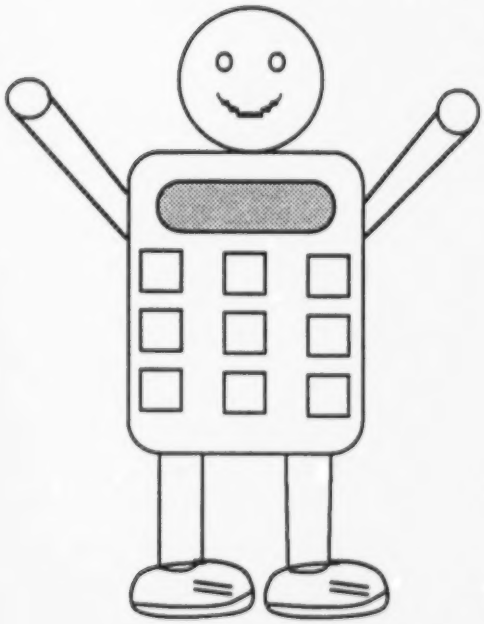
CALCULATORS AND MATHEMATICS PROJECT, LOS ANGELES

CHAPTER 2

PATTERNS AND FUNCTIONS

K-2



L.2

CREATE A PATTERN

GRADE: K - 2

STRAND: PATTERNS AND FUNCTIONS

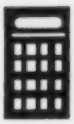
SKILL: Recognize and extend patterns

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each student
- Patterns transparency
  (Squares need to be cut and put in an envelope to be used in lessons 13 and 14)
- Create a Pattern Record Sheet (Kdgn or First/Second)
- Pencil
- Scissors and Paste (Kdgn)

VOCABULARY: Pattern, Pattern unit

PREREQUISITE SKILLS: Identify and extend simple patterns using concrete materials.

LESSON

- **DIRECTED INSTRUCTION:**

  Provide enough concrete experiences for students to understand, create, read and predict patterns. You may want to spend several days at the concrete level, especially with the kindergarten students before teaching this lesson.

  Here are some suggested materials for creating patterns.
  - **Pattern blocks** ΔΔ❑❑ΔΔ❑❑
  - **Attribute blocks**
  - **Unifix cubes**
  - **Beads**

1. To review pattern, follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
• Choose a boy to stand in front of the chalkboard. • Choose a girl to stand next to him. • Repeat the pattern until 6 children are positioned in line.	What is the pattern?	Boy,girl,boy,girl, boy, girl	

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TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	What is the pattern unit? (A pattern unit is that part of the pattern that repeats itself.)	boy, girl	
	What should come next if we continue our pattern?	boy	

2. To create number patterns on the calculator, follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Use the overhead number squares to form this pattern: 1 9 1 9			Read the pattern orally.
	What is the pattern unit?	1 9	
	How can we extend (continue) this pattern?	1 9 1 9 etc.	
Use different digits to create a pattern. Choose students to create different patterns on the overhead projector.			
Distribute a calculator to each student and place the overhead calculator on the projector. 			
Place this pattern on the overhead: 2 9 9 2 9 9	How could we make this pattern appear on our display?	Enter: 2 9 9 2 9 9	Enter the pattern into the calculator and read it orally. 2 9 9 2 9 9
			Create and practice different patterns with the calculator using 2 and 9: 229229 922922
			Record each pattern on the Create A Pattern Record Sheet. (Kdgn or First and Second)

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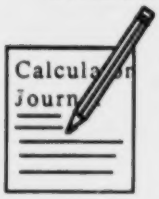
			Share patterns orally and determine how many different patterns were created using 2 and 9.

- **EVALUATION:**



What is your pattern?
What is your pattern unit?

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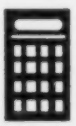
Name_____

CREATE A PATTERN - K

DIRECTIONS:

1. Enter a pattern on the display of your calculator.
2. Cut out the numbers to show your pattern.
3. Glue them on your paper.



1

2

3

2	2	2	2	2	2	2	2
9	9	9	9	9	9	9	9
2	2	2	2	2	2	2	2

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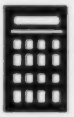
NAME _____

CREATE A PATTERN RECORD SHEET - 1st/2nd

DIRECTIONS:

1. Enter a pattern on the display of your calculator.
2. Record your pattern on the record sheet below.



1.

2.

3.

4.

5.

6.

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SAME NAME PATTERN

GRADE: K - 2

STRAND: PATTERNS AND FUNCTIONS

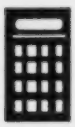
SKILL: Recognize that the same pattern unit can be represented in various ways.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each student
- Patterns transparency squares **(Lesson 13)**
- Same Name Pattern Record Sheet (Kdgn or First/Second)
- Pencil
- Scissors and Paste (Kdgn)
- Concrete materials: Unifix cubes, colored chips, attribute blocks, etc.

VOCABULARY: Pattern, pattern unit, digit

PREREQUISITE SKILLS: Identify and extend simple patterns using concrete materials and completion of Lesson 13

LESSON

- **DIRECTED INSTRUCTION:**

1. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
• Choose two girls to stand in front of the chalkboard. • Choose a boy to stand next to him. • Continue the pattern until 6 children are positioned in line.	What is the pattern?	Girl, girl, boy girl, girl, boy	
Now let's name our pattern: **A** **A** **B** girl girl boy **A** **A** **B** girl girl boy	What is our pattern unit?	AAB	

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TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Provide additional concrete experiences, as needed, to show that same pattern unit (**AAB**) can be represented in various ways: **A** **A** **B** hop hop jump ★ ★ ❑ red red blue			
Distribute a calculator to each student. Place the overhead calculator and number squares **(from Lesson 13)** on the projector.	How can we make a pattern with the same name **(AAB)**? an **AAB** pattern:	Choose a student to come up to the projector and place the numbers to show **2 2 9 2 2 9** 229229 or 992992	Enter the pattern into the calculator and read orally: **A A B A A B**
Display this pattern on the overhead 299299.	Is this an **AAB** pattern?	no	
	What could we name the pattern?	**ABB** 299	Choose 2 different digits and enter them into the calculator to make other **ABB** patterns: 74474474 61161161* ***Students will not be able to continue the pattern using the calculator because only 8 digits can be displayed. Discuss how the pattern would continue if there was room for more digits on the display. You could place several calculators side by side.**

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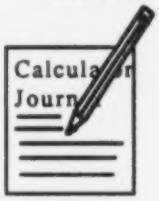
TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
			Record each pattern on the Same Name Pattern Record Sheet. (Kdgn, or First and Second.)
			★ On the First and Second Grade Record Sheet, students are asked to make their own pattern using 3 different digits and to name their pattern: **A B C A B C A B** 1 2 3 1 2 3 1 2 **A A B C A A B C** 1 1 2 3 1 1 2 3

- **INDEPENDENT PRACTICE:**

  2. Students can find all the different ways to make an **ABBC** pattern using the digits 6, 7, 8, 9. (Vary this activity using a different pattern and set of numbers.)
  ★ Use a calculator with tape if available.

- **EVALUATION:**



Teacher can show different patterns and ask: "What is the pattern unit?"

A A B C A A B C
3 3 4 5 3 3 4 5
(The pattern unit is **AABC**.)

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NAME_____

SAME NAME PATTERN - K

1. Enter the digits [4] and [8] into your calculator to make an **ABB** pattern.
2. Cut out the digits to show your pattern.
3. Paste them on your paper.

A	B	B	A	B	B	A	B

A	B	B	A	B	B	A	B

A	B	B	A	B	B	A	B

4	4	4	4	4	4	4	4
8	8	8	8	8	8	8	8
4	4	4	4	8	8	8	8

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NAME_____

SAME NAME PATTERN - 1ST/2ND

Choose 2 different digits and enter them into the calculator to make **ABB** or **AAB** patterns. Record your pattern on the record sheet below.

1.

A	B	B	A	B	B	A	B

2.

A	B	B	A	B	B	A	B

3.

A	A	B	A	A	B	A	A

4.

A	A	B	A	A	B	A	A

Make your own patterns using three different digits. Give your patterns a name.

5.

6.

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NUMBER DESIGN

GRADE: K - 2

STRAND: PATTERNS AND FUNCTIONS

SKILL: Identify number patterns and count by multiples.

MANAGEMENT

CLASS ORGANIZATION: Pairs

TIME FRAME: Half-hour

MATERIALS:

- One calculator for each pair of students
- Number Design Record Sheets
- Crayons
- Pencils

VOCABULARY: Count, twos, fives, tens, display

PREREQUISITE SKILLS: Use of constant feature: [C] [+] [2] [=] [=], completion of Lesson 5

LESSON

- **DIRECTED INSTRUCTION:**

Students will count equal groups of objects, record, and discover number patterns. They will be encouraged to explain how they arrived at their answers, brainstorm ideas, interact with each other to explain how they can use their calculators to count by twos, threes, fours, fives, etc., and record answers.

ASK THESE QUESTIONS	POSSIBLE ANSWERS
What are some things you can count by twos?	Eyes, ears, hands, legs, eyebrows, shoes bicycle wheels, rabbit ears, duck feet, etc.
Have five students stand in front of the room side by side and ask, "How many shoes are there?"	10 shoes
"How did you find out the answer?"	Counted by ones or twos.
"Which was faster?"	Counting by twos.
Have two more students come to the front of the room. "How many shoes do we have now?"	14 shoes
"How can we find out how many shoes there are in our classroom?"	• Whole class can come to the front of the room. • Students stand in a long line. • Use the calculator.
"How can we use the calculator to count by twos?"	Count by twos by using the constant feature: [C] [+] [2] [=] [=].

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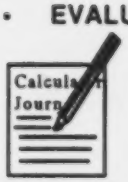
- **GUIDED PRACTICE:**

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute calculators and Number Design Record Sheet 1 to pairs of students.			
Review directions on the Number Design Record Sheet 1. Tell pairs of students to decide who will use the calculator and who will record.			Complete the Number Design Record Sheet.
	What patterns did you find? * Have total class discussion about the patterns they discovered.	Even numbers. Vertical patterns. Multiples of 2.	

- **INDEPENDENT PRACTICE:**

Number Design Record Sheet 2 is provided for students to count by threes. For example: Threes - sides on a triangle.

- **EVALUATION:**



Students can write about the number design in their Calculator Journal. (The pattern for 2 makes alternate vertical lines and the pattern for 3 makes diagonal lines.)

- **HOME ACTIVITY:**

Number Design Record Sheet 3 is provided for students to count by other numbers. Suggestions for number ideas are listed below. Students may add items to the list.

twos	Eyes, ears, twins . . .
threes	Tricycles, triplets, sides on a triangle . . .
fours	Legs on a chair, legs on a horse, sides on a square. . .
fives	Fingers on a hand, toes on a foot, cents in a nickel . . .
sixes	Drinks in a 6-pack, legs on an insect . . .
sevens	Days in a week . . .
eights	Legs on a spider . . .
nines	Players on a baseball team
tens	Cents in a dime, fingers on 2 hands. . .

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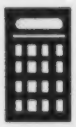
Name _____

NUMBER DESIGN: RECORD SHEET 1



1. How many are in the classroom? ☐

2. Use your calculator to count by twos. [C] [+] [2] [=] [=]

3. Press the keys, read the display and color the numbers to show how you counted by twos to get the answer.

4. Now continue coloring the pattern to 100.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

5. Talk to your partner about the pattern you see on your number design.

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Name _____

NUMBER DESIGN: RECORD SHEET 2

1. Find something in the classroom that you can count by threes.

2. Use your calculator to count by fours. [C] [+] [3] [=] [=]

3. How many _____ in the classroom? ☐

4. Press the keys, read the display and color in the numbers to show how you counted by fours to get the answer.

5. Now continue coloring the pattern to 100.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

6. Talk to your partner about the pattern you see on your number design.

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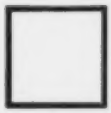
Name _____

NUMBER DESIGN: RECORD SHEET 3

1. Find something to count by _____
2. Use your calculator to count by _____ [C] [+] [ ] [=] [=]

3. How many _____? 
4. Press the keys, read the display and color in the numbers to show how you counted by _____ to get the answer.
5. Now continue coloring the pattern to 100.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

6. Talk to your partner about the pattern you see on your number design.

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DISCOVER AND COMPARE

GRADE: K - 2

STRAND: PATTERNS AND FUNCTIONS

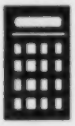
SKILL: Identify patterns, count by multiples and compare number patterns.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each student
- Discover and Compare transparency
- Overhead pen
- Record Sheets
  - Discover and Compare Two Number Patterns (Kdgn)
  - Discover and Compare Four Number Patterns (1st)
  - Discover and Compare Six Number Patterns (2nd)
- Home Activity - (Optional)
- Pencil

VOCABULARY: Compare, alike, different

PREREQUISITE SKILLS: Use of constant feature : [C] [+] [3] [=] [=], completion of Lesson 15

LESSON

- **DIRECTED INSTRUCTION:**

1. Teacher says: "We've been counting by different numbers and today we're going to compare different number patterns."

2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator to each student and place the overhead calculator and Discover and Compare transparency on the projector. Choose one student to use the overhead calculator and color in the numbers on the Discover and Compare transparency.	How can we use the calculator to count by 3's?	[C] [+] [3] [=] [=]	Press [C] [+] [3] [=] [=]

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TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Tell the recorder to color in the number 3 on the Discover and Compare transparency.			
Each time a new number appears on their calculator display, have students say the number orally so the recorder can color on the Discover and Compare Chart. (Say "press" each time students need to press the [=] so that the class stays together.) At some point, when the pattern becomes visible on the overhead ask this question:	Can you predict the next number in the pattern without using your calculator?	Accept all reasonable answers.	Continue to 100.
Follow the same steps to count by 5's.			
After both charts have been completed, have students describe each pattern and compare likenesses and differences.			

Possible Descriptions:

3's	5's
• Diagonal lines. 2 spaces between the numbers colored.	• Straight lines. • 4 spaces between the numbers colored.
• Number of boxes colored in each row or column follow this pattern: 3, 3, 4.	• All the numbers end with 5 or 0 (All the numbers have 5 or 0 in the ones place.)
• Different lengths for each diagonal line.	• Both lines are the same length.

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Discover and Compare Answer Key

COUNT BY 3'S — LEAVES ON A SHAMROCK

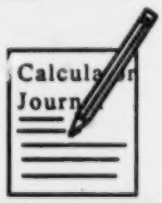
1	2	(3)	4	5	(6)	7	8	(9)	10
11	(12)	13	14	(15)	16	17	(18)	19	20
(21)	22	23	(24)	25	26	(27)	28	29	(30)
31	32	(33)	34	35	(36)	37	38	(39)	40
41	(42)	43	44	(45)	46	47	(48)	49	50
(51)	52	53	(54)	55	56	(57)	58	59	(60)
61	62	(63)	64	65	(66)	67	68	(69)	70
71	(72)	73	74	(75)	76	77	(78)	79	80
(81)	82	83	(84)	85	86	(87)	88	89	(90)
91	92	(93)	94	95	(96)	97	98	(99)	100

COUNT BY 5'S — FINGERS ON A HAND

1	2	3	4	(5)	6	7	8	9	(10)
11	12	13	14	(15)	16	17	18	19	(20)
21	22	23	24	(25)	26	27	28	29	(30)
31	32	33	34	(35)	36	37	38	39	(40)
41	42	43	44	(45)	46	47	48	49	(50)
51	52	53	54	(55)	56	57	58	59	(60)
61	62	63	64	(65)	66	67	68	69	(70)
71	72	73	74	(75)	76	77	78	79	(80)
81	82	83	84	(85)	86	87	88	89	(90)
91	92	93	94	(95)	96	97	98	99	(100)

- **GUIDED PRACTICE:**
  Use the Discover and Compare Record Sheets (Kdgn, First or Second).

- **EVALUATION:** How are your patterns alike? How are they different?



- **HOME ACTIVITY:**
  Students need 2 copies of the Home Activity so they can compare patterns.
  * The number chart on this page is a multiplication table rather than a hundreds chart. This will allow students to explore different patterns.

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COUNT BY 3'S LEAVES ON A SHAMROCK

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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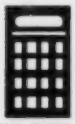

COUNT BY 5'S

FINGERS ON A HAND

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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NAME _____

DISCOVER AND COMPARE TWO NUMBER PATTERNS - K

DIRECTIONS: Color in the numbers to show how you counted by:

_____'S

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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NAME_____

DISCOVER AND COMPARE FOUR NUMBER PATTERNS - 1ST

DIRECTIONS: Color the numbers that show how you counted by:

'S

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

'S

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

'S

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

'S

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

How are your patterns alike?

How are they different?

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NAME _____ _____

DISCOVER AND COMPARE SIX NUMBER PATTERNS - 2ND

Directions: Color in the numbers to show how you counted by.

_____'s

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

_____'s

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

_____'s

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

_____'s

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

_____'s

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

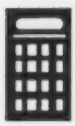
How are your patterns alike?

How are they different?

NAME_____

DISCOVER AND COMPARE - HOME ACTIVITY

1. Choose a number from 1 to 12. Write it in this box and in the first box on the chart below.
2. Count by that number using your calculator.
3. Each time you see a new number on the display, record it on the chart.
4. Stop when you get to or past 144.



5. Color in the squares on the chart below for each number that you wrote. You might find a number more than once.
6. Look for a pattern.
7. Tell about your pattern.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

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A SNACK PATTERN PROBLEM

GRADE: K - 2

STRAND: PATTERNS AND FUNCTIONS

SKILL: Look for a pattern as a problem solving strategy.

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator or calculator transparency
- Calculator for each pair of students
- A Snack Pattern Problem Record Sheet (Kdgn or 1st/2nd)
- A Snack Pattern Problem transparency of Record Sheet
- Raisins (each pair of students needs about 50 raisins or other snacks.)
- Pencil
- Crayons

VOCABULARY: Pattern, more, first ➡ twenty-fifth

PREREQUISITE SKILLS: Completed Lessons 13 - 16

LESSON

- **DIRECTED INSTRUCTION:**
  1. Teacher places A Snack Pattern Problem transparency on the overhead projector, distributes a record sheet to each pair of students and reads the problem:

KINDERGARTEN: Donald opened a box of raisins and passed them around to the children at the party. There were 6 children. The first child took 1 raisin, the second child took 3 raisins, the third child took 5 raisins and so on. How many raisins did the sixth child take?

FIRST/SECOND: Beatrice opened a box of raisins and passed them around to the children at the party. There were 6 children. The first child took 1 raisin, the second child took 4 raisins, the third child took 7 raisins and so on. How many raisins did the sixth child take?

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TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS		STUDENT DIRECTIONS
	How many raisins do you think the sixth child will take?			Share Predictions.
	How could we find out how many raisins the sixth child took?	Students brainstorm ideas: • Use objects • Use the chart • etc.		
Choose a student to place raisins on A Snack Problem transparency to show how many raisins each of the first three children took.				Place raisins on record sheet.
To help students discover a strategy for solving the problem, ask these questions:	How many raisins did the first child take?	1		Continue to place raisins (or other snacks) on the record sheet to solve the problem.
	How many did the the second child take?	Kdgn. 3	1st/2nd 4	
	How many more raisins did the second child take than the first?	2	3	
	How many raisins did the third child take?	5	7	
	How many more raisins did the third child take than the second child?	2	3	
	How many raisins do you think the fourth child will take?	7	10	
	What was the pattern?	Kdgn: Begin with 1 raisin and add 2 more raisins each time another child takes some. (count by twos starting with 1.) 1st/2nd: Begin with 1 raisin and add 3 more raisins each time another child takes some. (Count by threes starting with 1.)		
	How many raisins did the sixth child take?	Kdgn 11	1st/2nd 16	Continue the pattern circling the numbers below the chart.
	What if there were 25 children? How many raisins would the twenty-fifth child take?			Share predictions.

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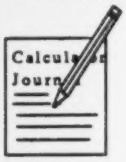
Distribute a calculator to each pair of students.	How could you use the calculator to help you?	Kdgn: [1][+][2][=][=], etc. 1st/2nd: [1][+][3][=][=], etc. * You need to enter 1 because the first child took one raisin or Kdgn: [11][+][2][=][=], etc 1st/2nd: [16][+][3][=][=], etc * You can enter 11 or 16 if you start with the 6th child.	Solve the problem using the calculator
	How many raisins did the 25th child take?	Kdgn: 49 1st/2nd: 73	Eat raisins as you color in the boxes.

- **EVALUATION:**



What is the pattern?
Can you continue the pattern?

- **HOME ACTIVITY:**

Use the Make A Snack Pattern Problem (Kdgn. or First and Second) to provide more problem solving experiences using Look for a Pattern as a strategy.

For example: Sue spent one dollar the first day at the shopping mall, five dollars the second day, nine dollars the third day, and so on. How many dollars did she spend the sixth day? * Have students make up their own problems. There needs to be a common difference between the numbers. For example, in 1, 5, 9, 13, ... there is a common difference of 4.

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A Snack Pattern - K

Name _____

Problem: Donald opened a box of raisins and passed them around to the children at the party. There were 6 children. The first child took 1 raisin, the second child took 3 raisins, the third child took 5 raisins, and so on. How many raisins did the sixth child take?

Child	Show the number of raisins taken.	Write the number
1		
2		
3		
4		
5		
6		

Circle the numbers in the pattern. Can you continue the pattern?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

What if there were 25 children? How many raisins would the 25th child take? _____

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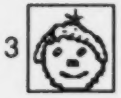
A Snack Pattern - 1st/2nd **Name** _____

Problem: Beatrice opened a box of raisins and passed them around to the children at the party. There were 6 children. The first child took 1 raisin, the second child took 4 raisins, the third child took 7 raisins, and so on. How many raisins did the sixth child take?

Child	Show the number of raisins taken.	Write the number
1		
2		
3 		
4		
5		
6		

Circle the numbers in the pattern. Can you continue the pattern?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

What if there were 25 children? How many raisins would the 25th child take? _____

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144

Home-Activity: Make A Snack Pattern Problem - K **Name**_____

Book 1: Grades K - 2
LESSON 17

Problem:

1

2

3

4

5

6

108

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115

Circle the numbers in the pattern. Can you continue the pattern?

116

1 2 3 4 5 6 7 8 9 10 11 12

13 14 15 16 17 18 19 20 21 22 23 24

Home-Activity: Make A Snack Pattern Problem - 1st/2nd

Name _____

Book 1: Grades K - 2
LESSON 17

Problem:

1

2

3

4

5

6

Circle the numbers in the pattern. Can you continue the pattern?

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39

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LOOKING FOR A PATTERN

GRADE: 2

STRAND: PATTERNS AND FUNCTIONS

SKILL: Look for a pattern as a problem solving strategy.

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Half-hour

MATERIALS:

- Overhead Calculator or calculator transparency
- Calculator for each student
- Looking For a Pattern Record Sheet
- Hamburger/Chili Dog Pictures
- Scissors
- Pencil

VOCABULARY: Pattern, chart

PREREQUISITE SKILLS: Completion of Lessons 13 - 17

LESSON

- **DIRECTED INSTRUCTION:**

1. Teacher places Looking For a Pattern transparency on the overhead projector, distributes a record sheet to each pair of students and reads the first problem:

> Last Sunday, the food stand at the park sold 3 hamburgers for every 4 chili dogs. At this rate, how many hamburgers were sold when 16 chili dogs were sold?

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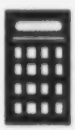
2. Follow these steps.

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	How many hamburgers do you think were sold when 16 chili dogs were sold?		Share predictions.
To help students discover a strategy for solving the problem, ask these questions:	How many hamburgers were sold when 4 chili dogs were sold?	3	
	How could we find out how many hamburgers were sold when 4 more chili dogs were sold?	Students brainstorm ideas: • Use object • Use chart • Calculator • etc.	Work in pairs and choose one or more strategies to answer the question. **• Pictures of hamburgers and chili dogs are provided.**
	How many hamburgers were sold when 4 more chili dogs were sold?	6	Explain strategy used to get the answer.
Record 6 on the chart under problem 1: hamburgers | 3 | 6 chili dogs | 4 |	What number should we write for chili dogs?	8	Copy numbers on the record sheet.
	What do the 6 and 8 mean on the chart?	6 hamburgers were sold for 8 chili dogs.	
Have students work in pairs to find the answers to these questions:	How many hamburgers were sold when 4 more chili dogs were sold?	9	Explain strategy used to get the answers. Write the numbers 9 and 12 on the chart.
	What number should you write for chili dogs?	12	
	What do the 9 and 12 mean on the chart?	9 hamburgers were sold for 12 chili dogs.	
Follow the same steps to complete the chart to find the answer to the problem:	How many hamburgers were sold when 16 chili dogs were sold?	12	Write the numbers 12 and 16 on the chart.
	Did you find a pattern? What is the pattern?	Yes, we counted hamburgers by 3 and chili dogs by 4.	
	How can we use the calculator to find out how many hamburgers were sold when 64 chili dogs were sold?	Use the [=] key to count by 3 and 4.	Use the [=] to solve the problem: [C][+][3][=][=]... [C][+][4][=][=]... Complete the chart
	How may hamburgers were sold when 64 chili dogs were sold?	48	Explain the strategy used to get the answer.

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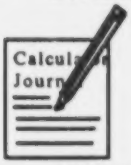
2. Continued

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Follow the same steps for problems 2, 3 and 4. **See Answer Key.**			Explain strategy used to get the answer and complete the chart.

- **EVALUATION:**



How did you use the calculator to find the pattern and solve the problems?

- **HOME ACTIVITY:**
  Students can write their own pattern chart problems.

Answer Key:

LOOKING FOR A PATTERN

1. Last Sunday, the food stand at the park sold 3 hamburgers for every 4 chili dogs. At this rate, how many hamburgers were sold when 16 chili dogs were sold?

Answer: 12

Complete this chart to find the answer:

hamburger	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
chili dogs	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64

How many hamburgers were sold when 64 chili dogs were sold?

Answer: 48

2. A store will trade 6 of their new cassette tapes for 9 of your old cassette tapes. How many of their cassettes will they trade for 144 of yours?

Answer: 96

Complete this chart to find the answer:

Your old tapes	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144
Their new tapes	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96

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3. Claire worked during the summer as a fire safety inspector. She noticed that 2 out of every 7 houses did not have smoke detectors. How many houses did not have smoke detectors if she inspected 82 houses?

·Answer: 22,23 or 24

Complete this chart to find the answer:

Number of houses	7	14	21	28	35	42	49	56	63	70	77	84*				
No smoke dectectors	2	4	6	8	10	12	14	16	18	20	22					

* Answer will vary because 82 is not a multiple of 7. Ask students to justify their answers. See Hit The Target (Lesson 5) Evaluation section.

Possible answers: 22, after the 77th house was inspected.
23, if only one of the houses 78th-82nd did not have a smoke detector.
24, if two of the houses 78th-82nd did not have a smoke detector.
22, if all of the houses 78th -82nd had smoke detectors.

4. Ed is a salesman. Last month he sold 6 mountain bikes for every 8 ten-speed bikes. He sold a total of 224 bikes. How many ten-speed bikes did he sell?

Answer: 128

Complete this chart to find the answer:

Mountain bikes	6															
ten speed bikes	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128
total bikes sold	14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224

* See if students will discover that it is not necessary to complete the mountain bike row to solve the problem.

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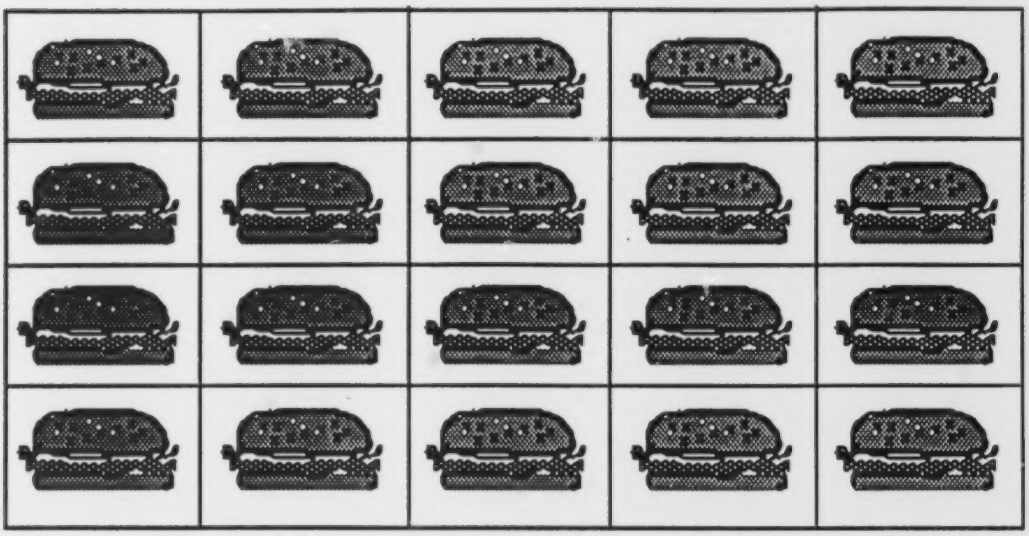
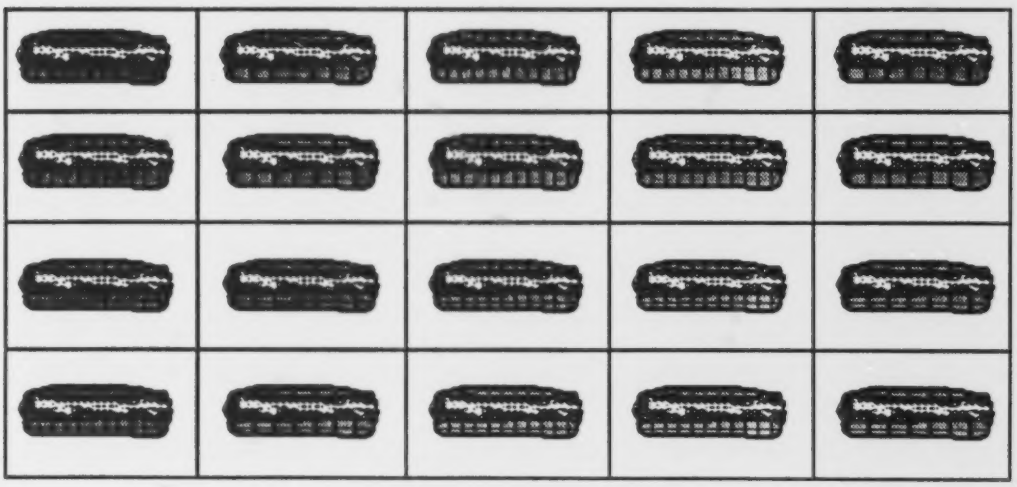
Cut out the boxes to help you solve Looking For a Pattern Problem 1





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Name _____

LOOKING FOR A PATTERN RECORD SHEET

1. Last Sunday, the food stand at the park sold 3 hamburgers for every 4 chili dogs. At this rate, how many hamburgers were sold when 16 chili dogs were sold?

ANSWER: ☐

Complete this chart to find the answer:

hamburgers	3															
chili dogs	4															

How many hamburgers were sold when 64 chili dogs were sold?

ANSWER: ☐

2. A store will trade 6 of their new cassette tapes for 9 of your old cassette tapes. How many of their cassettes will they trade for 144 of yours?

ANSWER: ☐

Complete this chart to find the answer:

Your old tapes																
Their new tapes																

Name _____

3. Claire worked during the summer as a fire safety inspector. She noticed that 2 out of every 7 houses did not have smoke detectors. How many houses did not have smoke detectors if she inspected 82 houses?

ANSWER: ☐

Complete this chart to find the answer:

Number of houses																
No smoke detectors																

4. Ed is a salesman. Last month he sold 6 mountain bikes for every 8 ten speed bikes. He sold a total of 224 bikes. How many ten speed bikes did he sell?

ANSWER: ☐

Complete this chart to find the answer:

Mountain bike																
Ten speed bike																
Total bikes sold																

EXPLORE A NEW KEY AND FIND A PATTERN

GRADE: 2

STRAND: PATTERNS AND FUNCTIONS

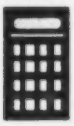
SKILL: Recognize and extend number patterns.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:



- Overhead Calculator or calculator transparency
- Calculator for each student
- Explore a New Key and Find A Pattern Record Sheets
- Pencil

VOCABULARY: Pattern, number, digits

PREREQUISITE SKILLS: Completion of Lessons 13 - 18; 24, 25

LESSON

- **DIRECTED INSTRUCTION:**

  Three calculator activities are provided for students to explore and enjoy the fascination of number patterns. Students will be using the [x] key but only as a way of discovering new number patterns. The concept of multiplication is taught in the Number strand.

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2. Follow these steps to introduce each activity:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator and Explore a New Key and Find a Pattern Record Sheet to each student.			
Use the overhead calculator to model the procedure for creating the pattern in Activity 1.			
Tell students that they will be using a new key: [x]			
Discuss the patterns in each column: Enter Enter Answer 37 x 3 = 1|1|1 37 x 6 = 2|2|2 37 x 9 = 3|3|3	What can you tell us about the numbers in the first Enter column?	The number is the same. (37)	
	What can you tell us about the numbers in the second Enter column?	Each number gets bigger by 3.	
	What can you tell us about the numbers in the Answer column?	The pattern is: 1 1 1 2 2 2 3 3 3	
	Can you predict how the pattern will continue?	Students make predictions.	Use the calculator to verify predictions. Continue the pattern and record results on the Explore a New Key and Find a Pattern Record Sheet: Activity 1. Optional: Use the second page to extend the pattern further.
Follow the same steps for Activity 2 and Activity 3.			

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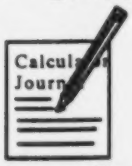
- **EVALUATION:**



What is the number pattern?
Can you continue the number pattern?
How can you use the calculator to help you continue the number pattern?

Answer Key:

Activity 1

37 x 3 = 111
37 x 6 = 222
37 x 9 = 333
37 x 12 = 444
37 x 15 = 555
and so on.

Activity 2

999 x 1 = 999
999 x 2 = 1998
999 x 3 = 2997
999 x 4 = 3996
999 x 5 = 4995
999 x 6 = 5994
and so on.

Activity 3

1 x 1 = 1
11 x 11 = 121
111 x 111 = 12321
1111 x 1111 = 1234321
*11111 x 11111 = 123454321
and so on.

* Remember that the display is limited to 8 digits.

To extend: This same activity can be used with 9:

9 x 9 = 81
99 x 99 = 9801
999 x 999 = 998001
9999 x 9999 = 99980001
Students can record on graph paper.

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NAME_____

EXPLORE A NEW KEY AND FIND A PATTERN: ACTIVITY 1

DIRECTIONS:
1. Enter the numbers and symbols into your calculator.
2. Record the answer.
3. What are the patterns?
4. Can you continue the patterns?

ENTER				ENTER			ANSWER			
3	7	X			3	=		1	1	1
3	7	X			6	=		2	2	2
3	7	X			9	=		3	3	3
3	7	X				=				
3	7	X				=				
3	7	X				=				
3	7	X				=				
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3	7	X				=				

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ENTER		X	ENTER		=	ANSWER			
3	7	X			=				
3	7	X			=				
3	7	X			=				
3	7	X			=				
3	7	X			=				
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3	7	X			=				
3	7	X			=				

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NAME_____

EXPLORE A NEW KEY AND FIND A PATTERN: ACTIVITY 2

DIRECTIONS:
1. Enter the numbers and symbols into your calculator.
2. Record the answer.
3. What are the patterns?
4. Can you continue the patterns?

ENTER			X	ENTER		=	ANSWER				
9	9	9	X		1	=			9	9	9
9	9	9	X		2	=		1	9	9	8
9	9	9	X		3	=		2	9	9	7
9	9	9	X		4	=		3	9	9	6
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
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9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					

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ENTER			X	ENTER		=	ANSWER				
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
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9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					
9	9	9	X			=					

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NAME_____

EXPLORE A NEW KEY AND FIND A PATTERN: ACTIVITY 3

1. Enter the numbers and symbols into your calculator.
2. Record the answer on both charts.
3. What are the patterns on each chart?
4. How far can you continue the pattern?

ENTER		
		1
	1	1
1	1	1

X
X
X
X

ENTER		
		1
	1	1
1	1	1

=
=
=
=

ANSWER				
				1
		1	2	1
1	2	3	2	1

Chart A

1												
1	2	1										
1	2	3	2	1								

Chart B

						1						
					1	2	1					
				1	2	3	2	1				

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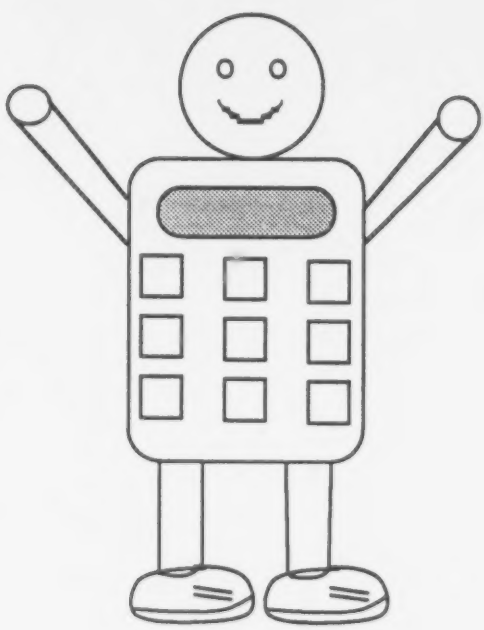
CAMP-LA

CALCULATORS AND MATHEMATICS PROJECT, LOS ANGELES

CHAPTER 3

NUMBER

K-2



IT COUNTS

GRADE: K - 2

STRAND: Number

SKILL: Count by numbers other than one to build the foundation for understanding the concept of multiples and remainders.

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Half-hour

MATERIALS: For each pair of students:

- Calculator
- 15 counters
- It Counts Record Sheet
- Pencil
- Calculator Race Record Sheet (Kdgn or 1st/2nd)
- Calculator Race Home Activity (optional)

VOCABULARY: No new vocabulary

PREREQUISITE SKILLS: Completion of Lessons 1 - 5; 13 - 16

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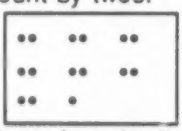
LESSON

- **DIRECTED INSTRUCTION:**

1. Follow these steps.

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator, 15 counters and the **It Counts** Record Sheet to each pair of students.			
Ask these questions:	How can we use the calculator to count by twos?	[C] [+] [2] [=] [=]	
	Do you think you can make the number 15 appear on your display if you count by twos?	Accept a "yes" or "no" answer at this time because students are making a prediction.	**Investigate:** • Press [+] • Press [2] • Press [=] • Continue pressing [=] to see if 15 will appear on the display. • Students will discover that it is impossible to count by twos to fifteen.
	What happened when you used the calculator to count by twos?	Accept all reasonable answers.	
	Why couldn't you make 15 appear on the display when you counted by twos?	Students brainstorm ideas.	
Let's use counters to help us discover why we couldn't make 15 appear on the display when we counted by twos.			• Use the counters to count by twos.  • Record on the **It Counts** Record Sheet while counting by twos. • Count by twos. • One student can use the counters while the other student records. • Explain the results of the investigation.

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TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	What happened when you used the counters to count by twos?	Accept all reasonable answers.	
	Why couldn't you count to 15 by twos?	We had one counter left over so we couldn't make equal groups of two.	
* With first and second graders you may want to introduce the term: remainders.			
Ask these questions:	What was the pattern on your record sheet?	Every other number was circled.	
	Why didn't you circle the number fifteen?	Because it wasn't part of the pattern and it's not a number that you get when you count by equal groups of two.	
* You may want to mention that all of the numbers circled are multiples of 2.			

* Optional

- **GUIDED PRACTICE:**

2. Teacher says, "You used the calculator, counters, and number patterns to find out if you could count by twos to 15. Now you can investigate other numbers to see if you can count to 15."

3. Follow these steps.

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Tell each pair of students to experiment with different numbers until they find one that they can use to count to 15.	Do you think there will be more than one number?	Accept a "yes" or "no" answer at this time because students are making a prediction.	**Investigate:** • Use the calculator or counters and record results on the It Counts Record Sheet. • Continue using different numbers until a solution is found. Answer: 3 and 5. • Discuss results.

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- **INDEPENDENT PRACTICE:**
  A Calculator Race Record Sheet is provided for further investigations.

- **EVALUATION:**
  - What numbers can you count by to reach 18? (1, 2, 3, 6, 9)
  - Why do you think you can count by 3 and 6 to reach 18?
  - Why couldn't you count by 4 to reach 18?
  - How did the calculator help you count?
  - What mathematics did you learn?

- **HOME ACTIVITY:**
  The Calculator Race Home Activity is provided for you to create your own record sheet. Choose any numbers appropriate for your students.

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NAME _____

IT COUNTS

Can you count to 15?

Directions:	Circle the number as you count by 2. Circle yes or no to answer the question. Then choose 2 different numbers and follow the same steps.

Count by 2

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15

yes

no

Count by ☐

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15

yes

no

Count by ☐

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15

yes

no

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NAME _____

CALCULATOR RACE

KDGN

WHO WILL WIN THE RACE?

DIRECTIONS: Use the calculator to count. Circle the numbers you can count by to reach the finish line.

3

4

5

FINISH LINE 75

2

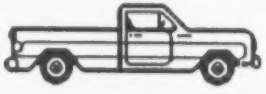
3

4

6

8

FINISH LINE 24



4

5

7

10

FINISH LINE 100

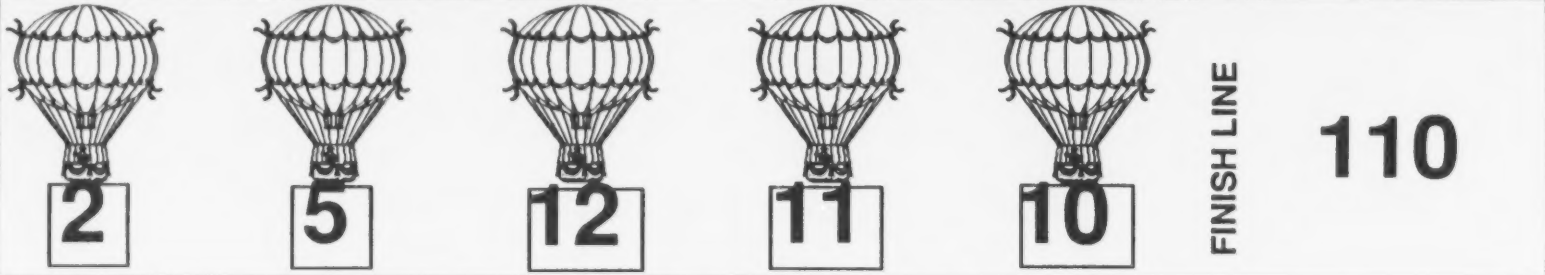
NAME _____

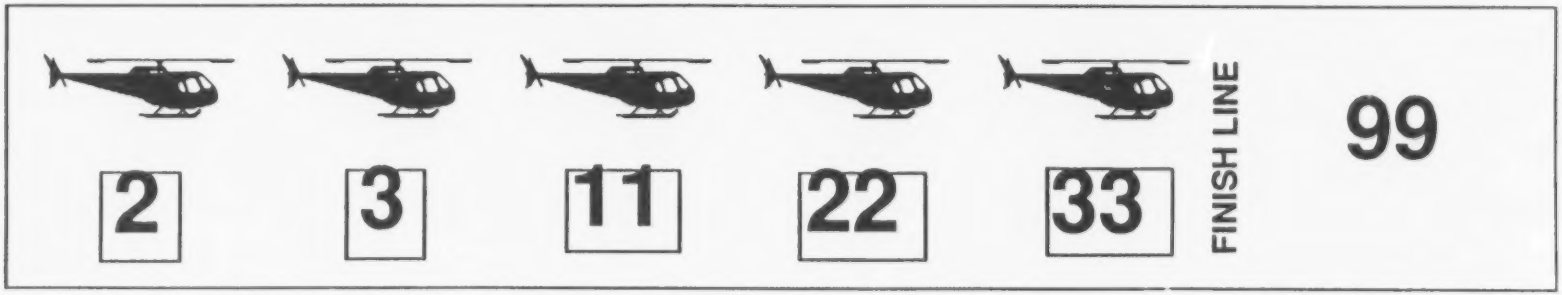
CALCULATOR RACE

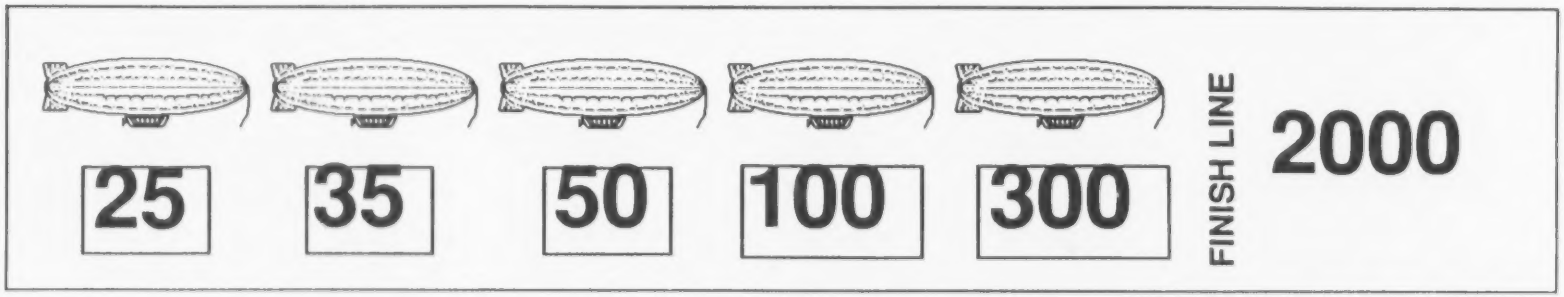
1st/2nd

WHO WILL WIN THE RACE?

DIRECTIONS: Use the calculator to count. Circle the numbers you can count by to reach the finish line.







HOME ACTIVITY

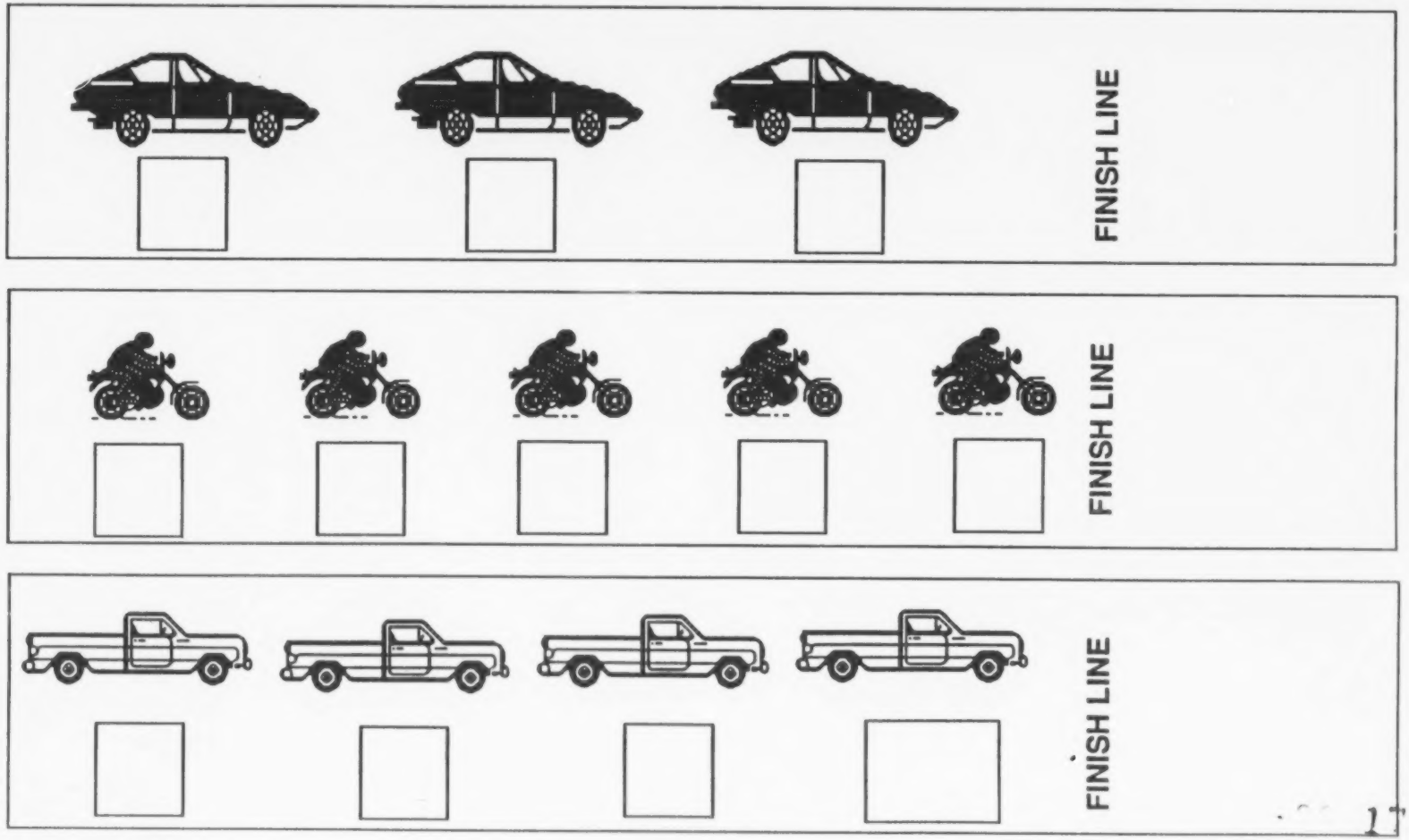
NAME _____

CALCULATOR RACE

KDGN

WHO WILL WIN THE RACE?

DIRECTIONS: Use the calculator to count. Circle the numbers you can count by to reach the finish line.



HOME ACTIVITY

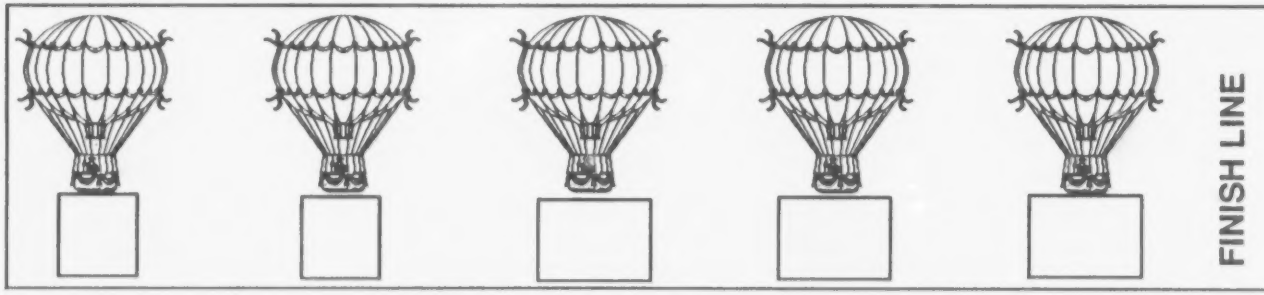
NAME _____

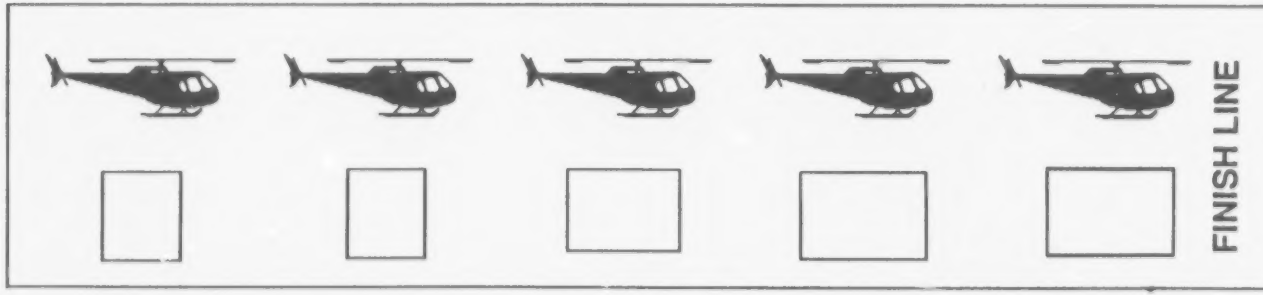
CALCULATOR RACE

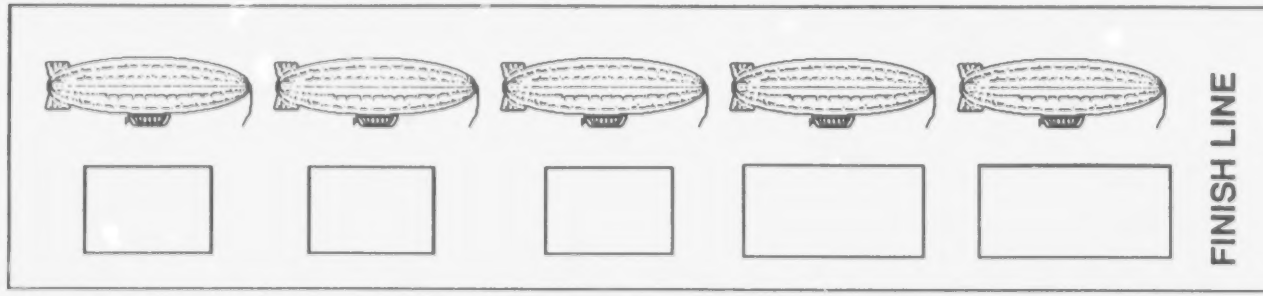
1st/2nd

WHO WILL WIN THE RACE?

DIRECTIONS: Use the calculator to count. Circle the numbers you can count by to reach the finish line.







SUPER CIRCUS

GRADE: K - 2

STRAND: NUMBER

SKILL: Count to a given number using only the [0], [1], [+], [-], [=], and [ON/C] keys.

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Half-hour

MATERIALS:

For each pair of students:
- Calculator
- Circus Elephants Sheet, Kdgn or First/Second
- Super Circus Record Sheet
- Scissors

VOCABULARY: Keystrokes

PREREQUISITE SKILLS: Count by tens and count on, Completion of Lessons 1-6, 13 - 16, 20

LESSON

- **DIRECTED INSTRUCTION:**

1. Teacher says, "Clancy Clown helped all the animals in the Super Circus get on the train safely. Then his job was to count the animals to make sure none were missing. Today we're going to help Clancy Clown solve a problem that happened while he was using his calculator."

2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a Circus Elephant sheet, Super Circus Record Sheet, scissors and calculator to each pair of students.			Cut out the circus elephants.
	What are some different ways to count the circus elephants?	Students brainstorm ideas: • Count by ones • Count by twos • Count by fives and then count on • Count by ten and then count on.	Arrange the circus elephants to show how you counted.
	How many circus elephants did you count?	16	

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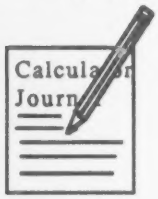
TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	What was the fastest way to count the circus elephants?	Accept all reasonable answers.	
Look at your Super Circus Record Sheet. Clancy Clown used his calculator to count the circus elephants. However, he had a problem. His calculator was different than most calculators. There were only six keys.	What are the keys on his calculator?	The six keys are [0], [1], [+], [-], [=] and [ON/C].	
	How can Clancy Clown use his calculator to count the circus elephants if he only has these six keys?	Students brainstorm ideas: • [C] [+] [1] [=] [=] etc. • [10] [+] [1] [=] [=] etc. • [10] [+] [10] [=] [-] [1] [=] [=] etc.	Try two different ways to count the circus elephants using only the six keys that Clancy Clown has on his calculator. Use tally marks to record the number of keystrokes on the Super Circus Record Sheet. One student can press the keys while another student makes the tally marks.
	What was the fastest way to count the circus elephants?	Accept all reasonable answers.	Record the fastest count.

- **INDEPENDENT PRACTICE:**

2. Follow the same steps to count the rest of the animals on the Super Circus Record Sheet.

- **EVALUATION:**



- How did you use your calculator to count the circus animals?
- How did you decide which was the fastest way to count the circus animals?
- How would you count the circus animals if you could use all the keys on the calculator?
- If you could design your own calculator which keys would you want?

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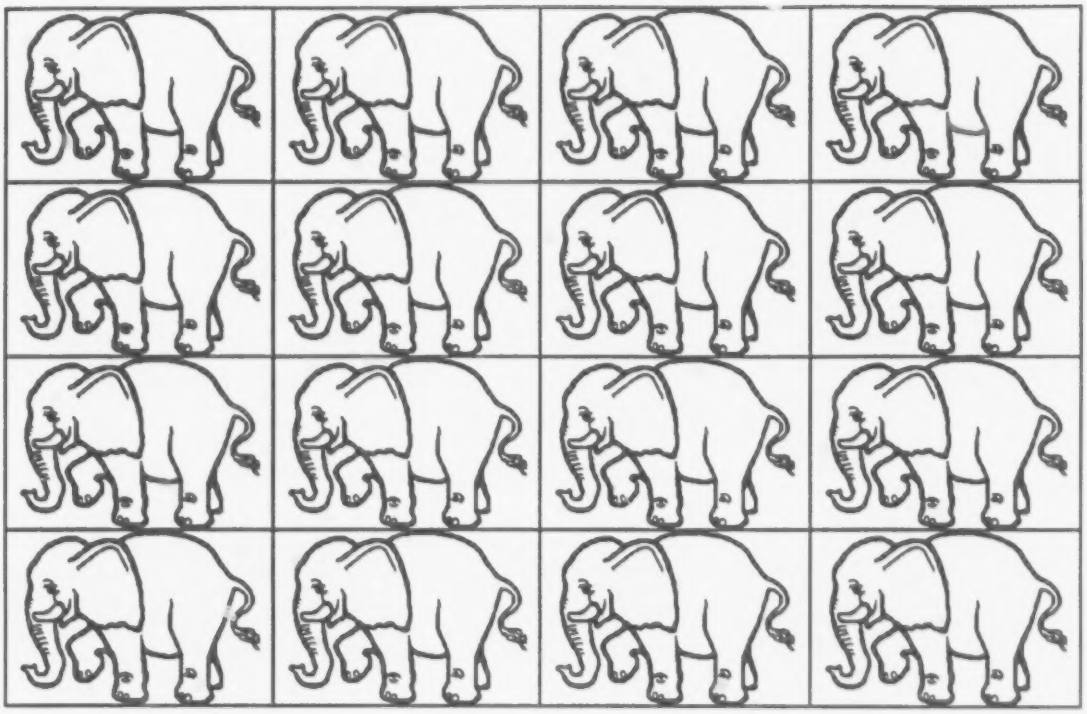
CIRCUS ELEPHANTS SHEET

Cut out the boxes.



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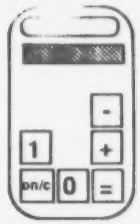
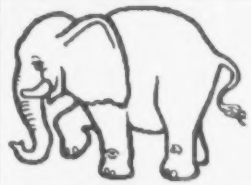
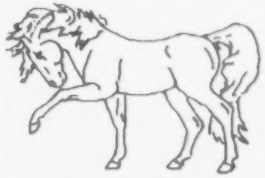
Name _____ _____

SUPER CIRCUS RECORD SHEET - K



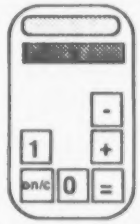
Help Clancy Clown find the fastest way to count the circus animals using his special six-key calculator.

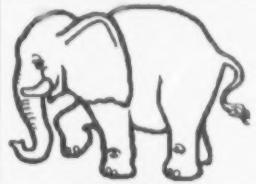
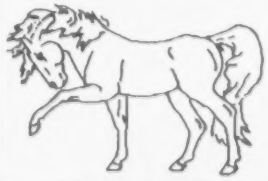
Animal	Number	First Count	Second Count	Fastest Count
	16			
	38			
	45			
	87			
	92			

Name _____

SUPER CIRCUS RECORD SHEET - 1st/2nd

Help Clancy Clown find the fastest way to count the circus animals using his special six-key calculator.



Animal	Number	First Count	Second Count	Fastest Count
	16			
	48			
	175			
	423			
	1284			

TAKING CARE OF BUSINESS

GRADE: K - 2

STRAND: Number/Measurement

SKILL: Choose the operation, addition [+] or subtraction [-] in problem solving situations.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator or calculator transparency
- Calculator for each student
- Sally's Bike Shop - calendar (Kdgn)
  Fred's Used Car Lot - calendar (1st)
  Donald's Marina - calendar (2nd)
- Sally's Bike Shop Record Sheet (Kdgn)
  Fred's Used Car Lot Record Sheet (1st)
  Donald's Marina Record Sheet (2nd)

You will need a transparency of the calendar and the record sheet for your grade level.

VOCABULARY: Addition, subtraction

PREREQUISITE SKILLS: Read a calendar, completed Lessons 7 - 9

LESSON

- **DIRECTED INSTRUCTION:**

1. Teacher says, "Today we are going to help Sally (Fred or Donald) keep business records for the bike shop (used car lot, or marina). She has to keep track of how may bikes she bought or sold during the month of March."

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2. Follow these steps: (The directions for Sally's Bike Shop can be adapted for Fred's Used Car Lot and Donald's Marina.)

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator and Sally's Bike Shop Record Sheets to each student.			
Place Sally's Bike Shop (calendar) transparency on the overhead and say, "The first thing we need to do is look at Sally's business calendar for March." **Reminder**: A prerequisite for this lesson is the ability to read the calendar.			
Ask these questions as students look at Sally's Bike Shop (calendar) Record Sheet.	How may bikes did Sally have in her shop on March 1?	74	
	What happened on March 5?	Sally sold 16 bikes.	
	How could we use the calculator to find out how many she has now?	Subtract 16 from 74.	Use the calculator to find out how many bikes Sally has now and record the answer.
Follow the same steps to help Sally complete the calendar. (see Answer Key) * Remind students that they can choose the calculator, mental math, or pencil and paper to discover the answer. This will help them to judge when the calculator can be used as an effective tool.			

3. Have students complete Sally's Bike Shop Business Record Sheet and discuss the results. Use the transparency to model this activity.

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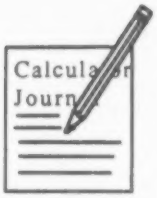
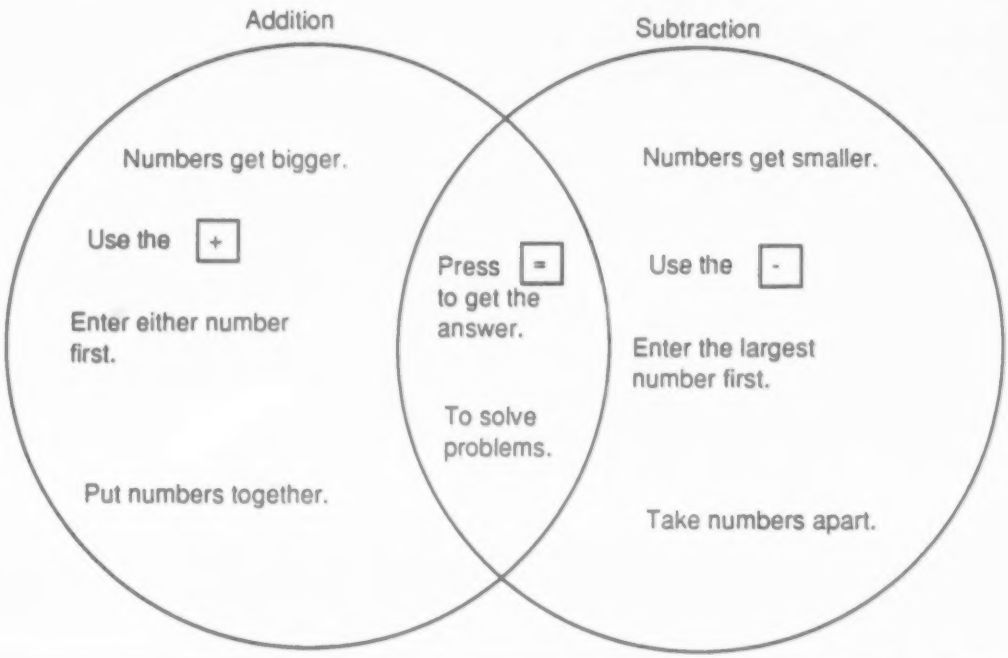
- **EVALUATION:**



How did you know which operation to use?
How did you know whether or not to use the calculator?
Did the owner have more bikes (cars or boats) or fewer bikes (cars or boats) on the last day of the month than on the first day of the month?
Compare the concepts of addition and subtraction using a Venn diagram.

Sample:

Name _____



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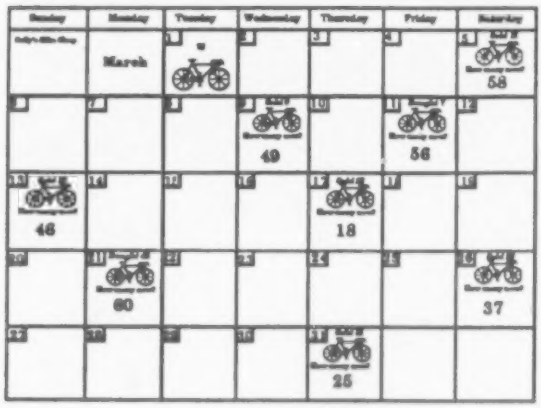
Answer Key - Kdgn



Sally's Bike Shop Business Record Sheet - KDGN

DIRECTIONS: Use your [bike] and [calendar] to answer these questions.

1. How many [bike] did [girl] have on the first Saturday?

58

2. How many [bike] did [girl] have on March 17?

18

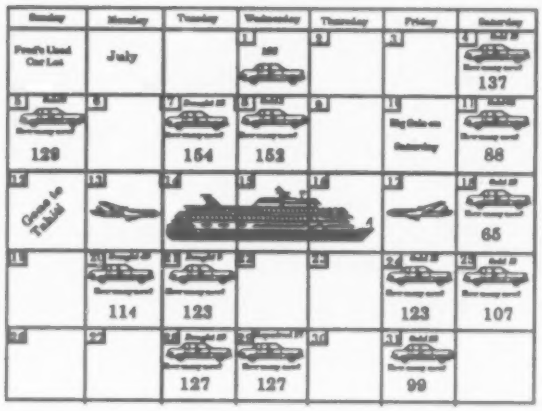
3. How many [bike] did [girl] have on March 24?

60

4. How many [bike] did [girl] have on the last Thursday in March?

25

Answer Key - 1st



Fred's Used Car Lot Business Record Sheet - 1st

DIRECTIONS: Use your [car] and [calendar] to answer these questions.

1. On what dates did Fred sell more than 20 [car]?

July 11 July 31

July 18

* There are only 3 dates.

2. How many [car] did Fred have on July 23?

123

3. How many [car] did Fred sell during the week of July 5?

74

4. How many [car] did Fred sell in July?

180

5. How many [car] did Fred buy in July?

103

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150

Answer Key - 2nd

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Donald's Marina	April			1 705	2	3 Sold 37 How many now? 668
4	5 Sold 2 dozen How many now? 644	6	7 Sold 100 How many now? 544	8	9 Big Sale on Sunday	10
11 Sold 245 How many now? 299	12	13 Bought 150 How many now? 449	14 Lost 17	15 Repair 43	16 How many now? 432	17 Sold 118 How many now? 314
18 Gone Skiing	19	20	21	22	23	24
25 2 For 1 Sale on Monday	26 Sold 38 How many now? 276	27	28 Bought 425 How many now? 701	29 Sold 1 less than 3 dozen How many now? 666	30	

Donald's Marina Record Sheet - 2nd

DIRECTIONS: Use your ▬ and ▦ to answer these questions.

1. How many boats did Donald have on the second Saturday in April?

   544

2. How many boats did Donald sell during the week of April 11?

   363

3. How many boats did Donald sell in April?

   597

4. How many boats did Donald buy in April?

   575

5. What is the difference between the number of boats Donald had on April 1 and April 30?

   39

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Name _____

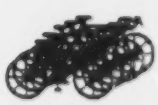
Sally's Bike Shop Business Record Sheet - KDGN

DIRECTIONS: Use your and to answer these questions.

1. How many did have on the first Saturday?

2. How many did have on March 17?

3. How many did have on March 24?

4. How many  did have on the last Thursday in March?

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Name _____

Fred's Used Car Lot Business Record Sheet - 1st

DIRECTIONS: Use your and to answer these questions.

1. On what dates did Fred sell more than 20 ?

2. How many did Fred have on July 23?

3. How many did Fred sell during the week of July 5?

4. How many did Fred sell in July?

5 How many did Fred buy in July?

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Name _____

Donald's Marina Business Record Sheet - 2nd

DIRECTIONS: Use your and to answer these questions.

1. How many boats did Donald have on the second Saturday in April?

2. How many boats did Donald sell during the week of April 11?

3. How many boats did Donald sell in April?

4. How many boats did Donald buy in April?

5. What is the difference between the number of boats Donald had on April 1 and April 30?

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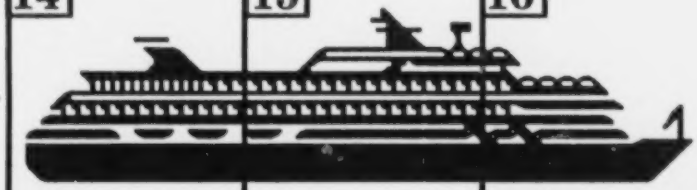
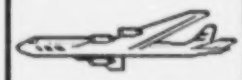
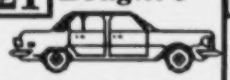
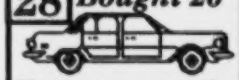
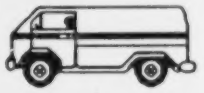
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Sally's Bike Shop	**March**	1 *74*	2	3	4	5 *Sold 16* How many now?
6	7	8	9 *Sold 9* How many now?	10	11 *Bought 7* How many now?	12
13 *Sold 10* How many now?	14	15	16	17 *Sold 28* How many now?	18	19
20	21 *Bought 42* How many now?	22	23	24	25	26 *Sold 23* How many now?
27	28	29	30	31 *Sold 12* How many now?		

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Fred's Used Car Lot	July		1 *156*	2	3	4 *Sold 19* How many now?
5 *Sold 8* How many now?	6	7 *Bought 25* How many now?	8 *Sold 2* How many now?	9	10 Big Sale on Saturday	11 *Sold 64* How many now?
12 Gone to Tahiti	13	14 	15	16	17 	18 *Sold 23* How many now?
19	20 *Bought 49* How many now?	21 *Bought 9*  How many now?	22	23	24 *Sold 18* How many now?	25 *Sold 18* How many now?
26	27	28 *Bought 20*  How many now?	29 *Repaired 27* How many now?	30	31 *Sold 28* How many now?	

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Donald's Marina	**April**			1 *705*	2	3 *Sold 37* How many now?
4	5 *Sold 2 dozen* How many now?	6	7 *Sold 100* How many now?	8	9 **Big Sale on Sunday**	10
11 *Sold 245* How many now?	12	13 *Bought 150* How many now?	14 *Lost 17*	15 *Repair 42*	16 How many now?	17 *Sold 118* How many now?
18 **Gone Skiing**	19	20	21	22	23	24 
25 **2 For 1 Sale on Monday**	26 *Sold 38* How many now?	27	28 *Bought 425* How many now?	29 *Sold 1 less than 3 dozen* How many now?	30	

NUMBER MAGIC

GRADE: 1 - 2

STRAND: NUMBER

SKILL: Use place value to change digits in two-digit numbers.

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Half-hour

MATERIALS:

- Calculator
- Magic Rabbits Sheet
- Hundreds Chart (One chart per student)
- Scissors

VOCABULARY: Tens, ones, digit

PREREQUISITE SKILLS: Count by tens, count on from a multiple of ten, completed Lessons 1 - 10, 13 - 17, 20 - 22.

LESSON

- **DIRECTED INSTRUCTION:**

1. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a Magic Rabbits Sheet, Hundreds Chart, scissors and calculator to each student.	How can we count the number of rabbits on this page?	Students brainstorm ideas: • Count by ones • Count by twos • Count by fives • Count by tens	
	What would be the fastest way to count the rabbits?	Count by tens.	Cut out strips of 10 rabbits. Any leftovers can be cut out separately. Then count the rabbits and enter the total number of rabbits into the calculator.
	How many rabbits were there?	54	
	How did you get your answer?	• Counted by tens to 50 and then counted on by ones to 54. • Accept all other reasonable answers.	

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TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	How can you use the hundreds chart to show how you counted?	Count by tens to 50 and then count on by ones to 54	Color in the hundreds chart to show how you counted:
Let's use these rabbits to help us perform a magic trick with the calculator. Once you know the secret you can make numbers change or disappear.	How many rabbits were there?	54	
	What does the 5 mean?	• 5 tens • 50	
	How can we make the 5 disappear?	Take away 5 groups of ten.	Take the 5 tens away.
	How many rabbits do you have left?	4	
	You had 54 rabbits. How many did you take away to make the 5 disappear?	50	
Now let's perform the same magic trick with the calculator.	What number is on your display?	54	
	How can we make the 5 disappear?	• Take away 50. • Take away 5. * If students suggest that you take away 5 instead of 50 then let them try it and discuss the results.	
	If you make the 5 disappear, then what number do you think will be on your display?	4	Press [-] [50] [=]
	What number is on your display now?	4	

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	You had 54 on your display. What did you do to make the 5 disappear?	• Press [-] [50] [=] • Subtract 50	
	How did you perform the same magic trick with your calculator that you did with the rabbits?	Both times we subtracted 50.	

- **GUIDED PRACTICE:**

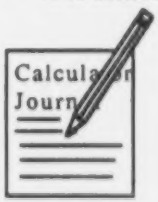
  2. Follow the same steps using other two-digit numbers to:

  - Make the number in the tens place disappear. (Make the 3 in 37 disappear so that 7 appears on the display.)
  - Make the number in the tens place change to another number. (Make the 4 in 41 change to 2 so that 21 appears on the display.)
  - Make the number in the ones place disappear or change to another number. (Make the 8 in 28 disappear so that 2 appears on the display. Change the 8 in 28 to 6 so that 26 appears on the display.)

- **INDEPENDENT PRACTICE:**

  Students can work in pairs. One student enters a two-digit number and tells the partner how to change one of the digits or make it disappear.

- **EVALUATION:**



- How did you make the numbers change or disappear?

- How can you make the numbers change or disappear when you have a three-digit number?

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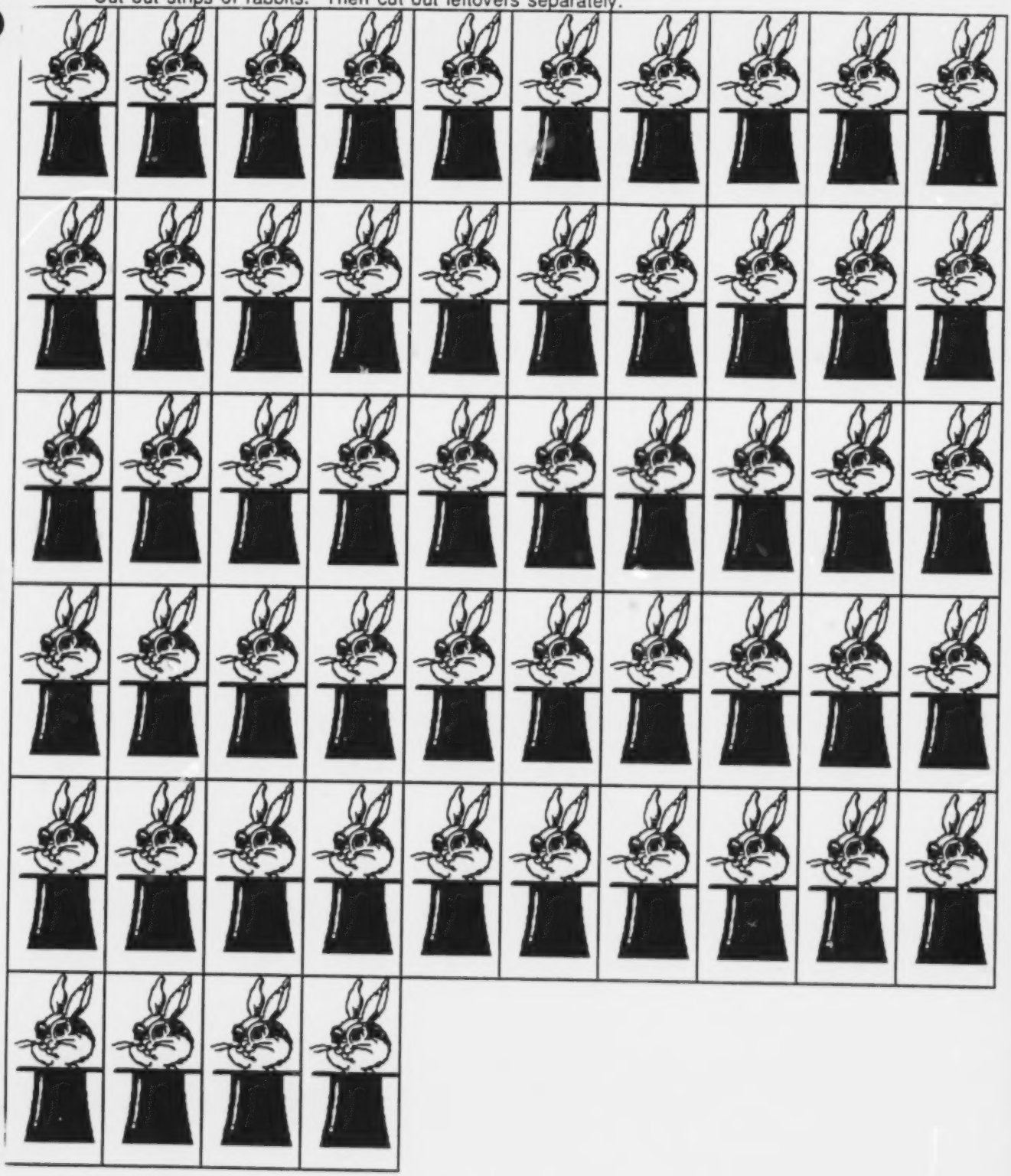
MAGIC RABBITS

Cut out strips of rabbits. Then cut out leftovers separately.



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BEST COPY AVAILABLE

Name _____

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Cut Here

Name _____

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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HOW MANY TILES?

GRADE: 1 - 2

STRAND: NUMBER

SKILL: Discover that multiplication is repeated addition

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Two half-hour sessions

MATERIALS:

- Overhead calculator or calculator transparency
- Calculator for each pair of students
- 1-inch tile squares (or construction paper tiles)- 50 per pair of students
- Secret Rectangles Record Sheet
- How Many Tiles? Record Sheet
- Pencil

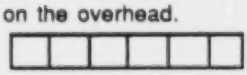
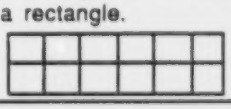
VOCABULARY: Row, rectangle, total, bigger, smaller, equal groups, multiplication

PREREQUISITE SKILLS: Ability to count and do simple addition, Lesson 5

LESSON

- **DIRECTED INSTRUCTION:**

1. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator and 50 tiles to each pair of students.			
Place a row of 6 tiles on the overhead. 	How many tiles did I use?	6	Copy the row of 6 tiles.
Place another row of 6 tiles on the overhead and push the rows together to make a rectangle. 	How many rows of tiles do I have now?	2	Add another row of 6 tiles.
	How many tiles in each row?	6	
	How could you describe your rectangle?	It has 2 rows of 6 tiles.	State answer orally (12)
	How could you find out the total number of tiles in your rectangle?	• Count • 6+6 • 2x6	

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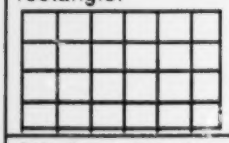
TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Add 2 more rows of 6 tiles to make a bigger rectangle. 	How many rows do I have now?	4	Add 2 more rows of 6 tiles.
	How many tiles in each row?	6	
Ask these questions to help students discover that multiplication is repeated addition:	How could you describe your rectangle?	It has 4 rows of 6 tiles.	Use the calculator to find out the total number of tiles in the rectangle.
	Now we have more tiles to count. How could we use the calculator to help us find out the total number of tiles in the rectangle?	•[C][6][+][6][+][6][+][6][=] •[+][[6][=][=][=][=] •[C][4][x][6][=]	
	If you use the [=], what number do you need to enter after [C] [+]? Why?	[6] There are 6 tiles in each row.	
	How many times would you need to press [=]? Why?	4 times. There are 4 rows.	
Tell students that there is even a faster way to find out the total number of tiles in the rectangle that is 4 rows of 6.			
Place the overhead calculator on the projector and enter [4][x][6][=] to show the total number of tiles in the rectangle.			Enter [4][x][[6][=] as teacher models on the overhead calculator.
	What number do you see on the display?	24	
	Is that the same number you got when you used the [=]?	yes	
	Why did you get the same answer?	The first time we entered 6 into the calculator 4 times. We did the same thing using the [x] key but it was faster.	

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Solution:

(4 rows of 6)	6+6+6+6=24 or [C][+][6][=][=][=][=] or	
4 x	6 =	24
Number of rows in the rectangle.	Number of tiles in each row	Total number of tiles in the rectangle.

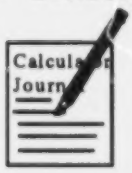
- **Before going on to the next step you may want to practice making larger or smaller rectangles using repeated addition and relating it to the multiplication symbol following the same steps.**

- **GUIDED PRACTICE:**
  2. Use the Secret Rectangles Record Sheet to provide more practice using the [x] on the calculator to find the total number of tiles in each rectangle. (Students will discover that all rectangles on the sheet have a total number of 24 tiles.)

- **INDEPENDENT PRACTICE:**
  3. Use the How Many Tiles? Record Sheet. Students can choose a number and find all the different rectangles they can make using the same number of tiles each time.

     Example: 28, (2 rows of 14, 4 rows of 7, etc.)

- **EVALUATION:**



  - How did you use your calculator to find the total number of tiles in each rectangle?
  - How could you do these using multiplication?

[C][+][4][=][=][=]	3 x 4 =
[C][+][5][=][=][=][=]	4 x 5 =
[C][+][6][=][=]	2 x 6 =

*Discuss the idea of multiplication as a faster way to do repeated addition.

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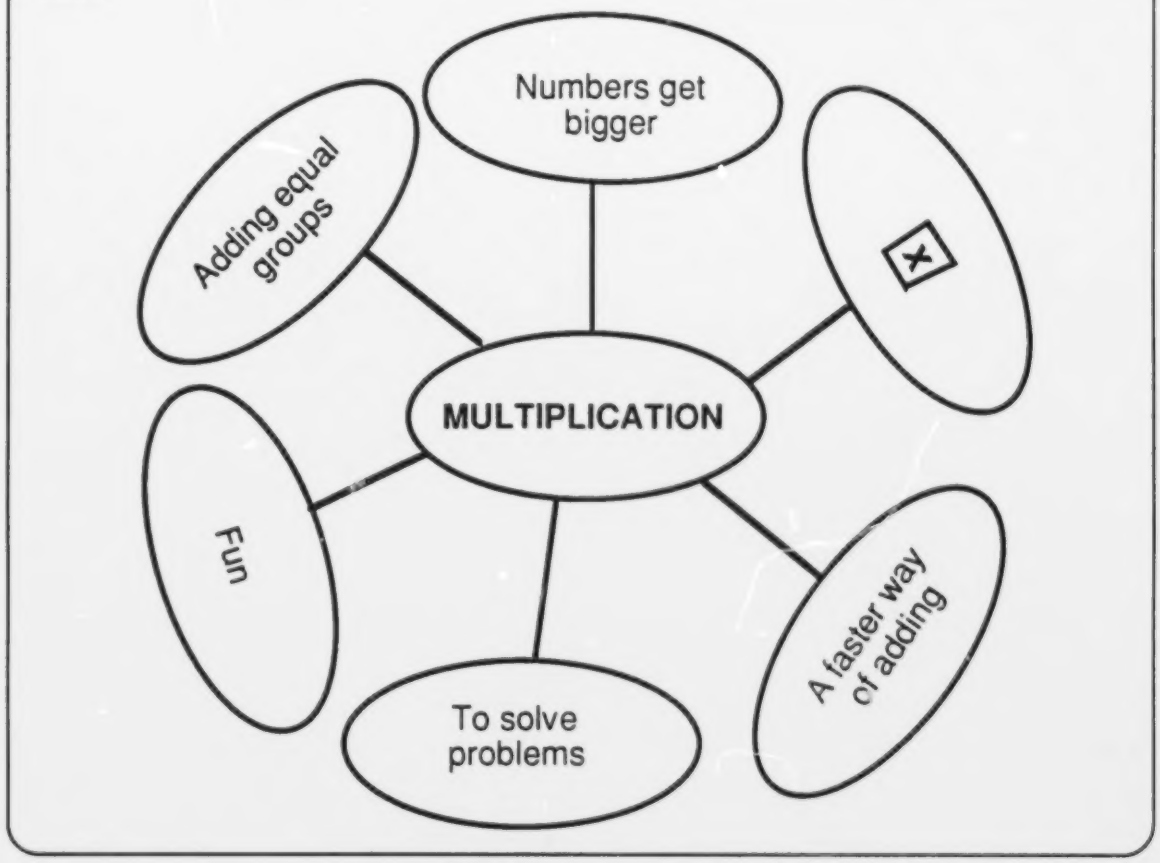
- What is multiplication?

  Make a network of all the words you can think of for multiplication.

Sample

Name _____



- **HOME ACTIVITY:**

  Find a rectangular room or location covered by square tiles (floor, ceiling, table top, etc.). Count the number of rows and tiles in each row. Use the calculator to find the total number of square tiles. Record the information and results.

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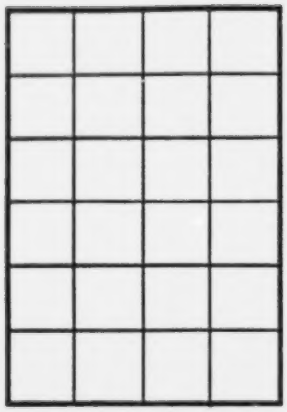
NAME _____

SECRET RECTANGLES

1



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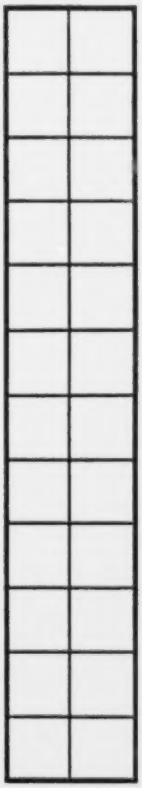
2



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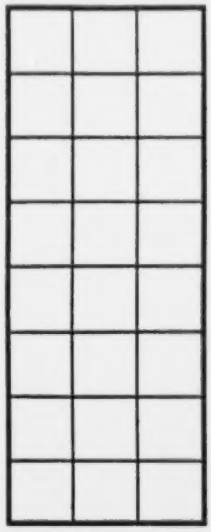
3



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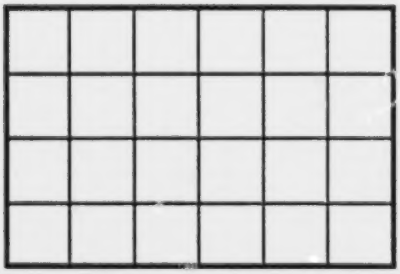
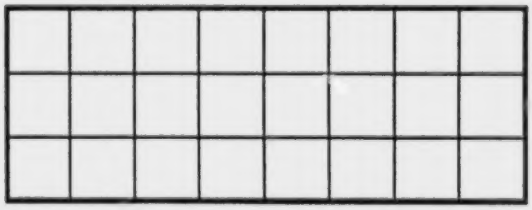
4



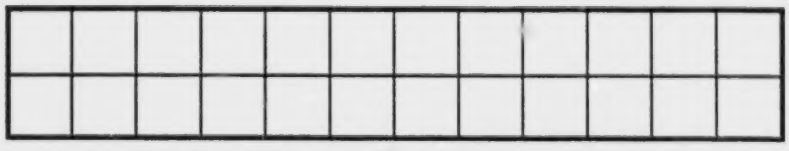
☐ X ☐ = ☐

5



☐ X ☐ = ☐

6



☐ X ☐ = ☐

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NAME _____

HOW MANY TILES?

DIRECTIONS:

Use your calculator to multiply.

	ENTER	X	ENTER	=	ANSWER
	How many rows in the rectangle?		How many tiles in each row?		What is the total number of tiles in the rectangle?
1					
2					
3					
4					
5					
6					

DIRECTIONS:

1. Make a rectangle using tiles.
2. Enter the number of rows in the rectangle.
3. Press [X].
4. Enter the number of tiles in each row.
5. Press [=].
6. Write the number on the display to show the total number of tiles.
7. Follow the same steps to find all the different rectangles you can make using the same number of tiles each time.

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THE PARADE!

GRADE: 1 - 2

STRAND: NUMBER

SKILL: Use one or two-digit multiplication in problem solving situations.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator or calculator transparency
- Calculator for each student
- Order Form: Marching Band (Transparency)
- Order Form Record Sheets
- Pencil

VOCABULARY: Multiplication, [x], operation, equation

PREREQUISITE SKILLS: Completion of Lesson 24.

LESSON

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- **DIRECTED INSTRUCTION:**

1. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	Have you ever been to a parade? (Allow time for students to tell about the parades.)	Yes	
Let's pretend that our class was selected to help plan a holiday parade. Our job is to make a list of supplies that we will need to order for the parade.			
Distribute a calculator and the two Order Forms to each student and place the Order Form: Marching Band transparency on the overhead.			
Tell students that they will be ordering instruments and uniforms for the marching band.			
Choose a student to read the first problem about Instruments: **There will be 79 drummers. How many drumsticks if each person needs 2?**			
Ask these questions to help students complete the order form to solve this problem.	How many drummers?	79	Record 79 in the Number of People column.
	What does each person need?	2 drumsticks	Record 2 in the Items Per Person column.
	What do we need to find out?	The total number of drumsticks needed.	
	What operation could we use to solve this problem? Why?	Multiplication • We're counting equal groups • We're counting 79 groups of 2.	
	How could we use the calculator to help us solve the problem?	• Enter [79] • Press [x] • Enter [2] • Press [=]	Use the calculator to solve the problem and complete the equation on the Order Form. (158)
	How many drumsticks do you need to order?	158	
Follow the same steps to complete the Order Form: Marching Band.			Explain your answers.

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- **INDEPENDENT PRACTICE:**
  2. Complete the Order Form: Floats.

Answer Key:

Order Form: Marching Band

Instruments

Number of People	x	Items Per Person	=	Total Items Needed
1. 79	x	2	=	158
2. 83	x	7	=	581
3. 54	x	1	=	54
4. 67	x	2	=	134

Uniforms

Number of People	x	Items Per Person	=	Total Items Needed
1. 214	x	4	=	856
2. 249	x	6	=	1494
3. 184	x	3	=	552

Order Form: Floats

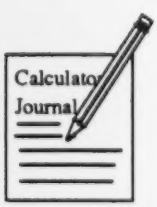
Decorations

Number of Floats	x	Items Per Float	=	Total Items Needed
1. 37	x	4	=	148
2. 28	x	5 or 1	=	140 or 28
3. 45	x	8	=	360
4. 16	x	9 or 108	=	144 doz or 1728 roses

Workers

Number of Floats	x	People Per Float	=	Total Number of People Needed
1. 29	x	3	=	87
2. 36	x	3	=	108
3. 19	x	12	=	228

- **EVALUATION:**



- How did you use the calculator to find the answer?
- What is multiplication?

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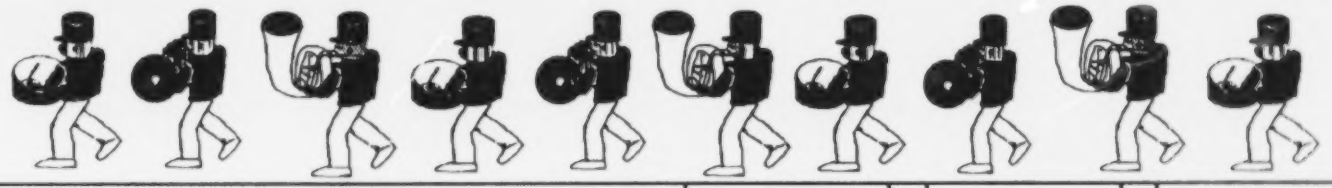
Name_____

Order Form: *Marching Band*



Instruments	Number of People	x	Items Per Person	=	Total Items Needed
1. There will be 79 drummers. How many drumsticks if each person needs 2?					
2. There will be 83 bell players. How many jingle bells if each person needs 7?					
3. There will be 54 tuba players. How many tubas if each person needs one?					
4. There will be 67 cymbal players. How many cymbals if each person needs 2?					

Uniforms	Number of People	x	Items Per Person	=	Total Items Needed
1. There will be 214 people. How many gold buttons if each person needs 4?					
2. There will be 249 people. How many streamers if each person needs 6?					
3. There will be 184 people. How many pins if each person needs 3?					

Book 1: Grades K - 2
LESSON 25

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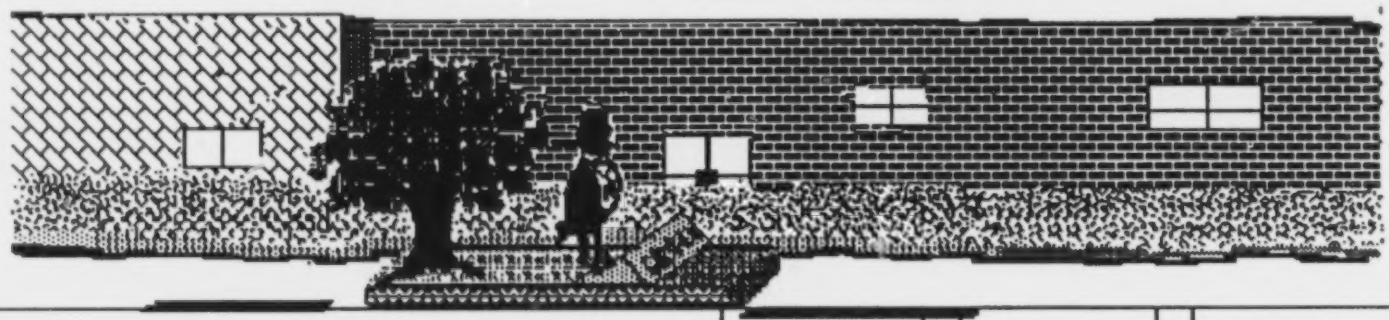
Order Form: Floats

Name_____



Decorations	Number of Floats	x	Items Per Float	=	Total Items Needed
1. There are 37 floats. How many banners if each float needs 4?					
2. There are 28 floats. How many tires if each float needs a spare tire?					
3. There are 45 floats. How many lights if each float needs 8?					
4. There are 16 floats. Each float needs 9 dozen roses. How many roses?					

Workers	Number of Floats	x	People Per Float	=	Total Number of People Needed
1. There are 29 floats. How many drivers if each float needs two drivers in the front and one in the back?					
2. There are 36 floats that need to be repaired. How many mechanics if each float needs 3?					
3. There are 19 floats that need 12 people to ride on them during the parade. How many people?					

Book 1: Grades K - 2
LESSON 25

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HOW MANY HANDFULS?

GRADE: 1 - 2

STRAND: NUMBER

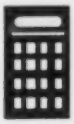
SKILL: Division: Given the quantity of objects and the number in each group, find the number of groups.

MANAGEMENT

CLASS ORGANIZATION: Pairs

TIME FRAME: Half-hour

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each student
- Brown bags or plastic bags (1 per pair of students)
- Popcorn (or unsalted peanuts, beans or other small objects)
  - Place 15 pieces of popcorn in teacher's bag, and 24 in student bags. (Students can count out 24 pieces from a central container.)
- How Many Handfuls? Record Sheet 1(One per pair of students)
- How Many Handfuls? Record Sheet 2 (one per each student)
- Pencil

VOCABULARY: Quantity, equal groups, division, [+] key

PREREQUISITE SKILLS: Concept of equal groups.

LESSON

- **DIRECTED INSTRUCTION:**

1. **Teacher holds up a brown paper bag and says**, "I have 15 pieces of popcorn in this bag. I'm going to give out the popcorn in handfuls of 3."

2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	How many handfuls will I pass out?	Students can estimate.	
Choose about 10 children to stand in front of the room. Give 3 pieces of popcorn to the first child, then 3 to the second child and so on until there is no popcorn left in the bag.	How much popcorn did I start with?	15	
	How many were in each handful?	3	
	How many handfuls did I pass out?	5	
Summarize: "We started with 15 pieces and found out that when we divided into equal groups of 3, we got 5 handfuls of popcorn."			

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3. Students are ready to work in pairs. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute the How Many Handfuls? Record Sheet 1, a bag, popcorn and two calculators for each pair of students.			
Tell each pair of students to count 24 pieces of popcorn and place them in a bag.	How many handfuls of 3 do you think you will be able to pass out?	Students estimate how many handfuls of 3 they will be able to pass out.	Place 3 pieces on each hand of the How Many Handfuls? Record Sheet 1 until there is no popcorn left in the bag.
	How many handfuls of 3 did you pass out?	We started with 24 pieces and found out that when we divided into equal groups of 3, we got 8 handfuls.	

4. Follow these steps to use the calculator to show how we divided a quantity (24 pieces of popcorn) into equal groups of 3.

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS
Place the overhead calculator on the projector.	How much popcorn did you start with?	24
Enter 24 into your calculator.	How many pieces were in each handful?	3
We divided the popcorn into groups of 3, so press[÷] and then enter 3.		
Press [=] to find out how many handfuls.	How many handfuls of 3 were there?	8

5. Summarize:

24	÷	3	=	8
Quantity of popcorn	Divided by	Pieces in each handful	=	How many handfuls

- **GUIDED PRACTICE:**

6. For practice using the division key on the calculator have students solve these problems on the How Many Handfuls? Record Sheet 2. Provide concrete experiences as needed.

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Answer Key:

1. If there are 28 pieces of popcorn in a bag and each person gets 4, how many people will get a handful of 4 pieces?	28 (Quantity of popcorn) ÷ 4 (Divided by) = 7 (Pieces in each handful) (How many handfuls?)
2. If there are 35 pieces of popcorn in a bag and each person gets 7, how many people will get a handful of 7 pieces?	35 (Quantity of popcorn) ÷ 7 (Divided by) = 5 (Pieces in each handful) (How many handfuls?)
3. If there are 45 pieces of popcorn in a bag and each person gets 5, how many people will get a handful of 5 pieces?	45 (Quantity of popcorn) ÷ 5 (Divided by) = 9 (Pieces in each handful) (How many handfuls?)

6. Allow students to eat popcorn at the conclusion of the lesson.

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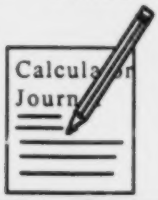
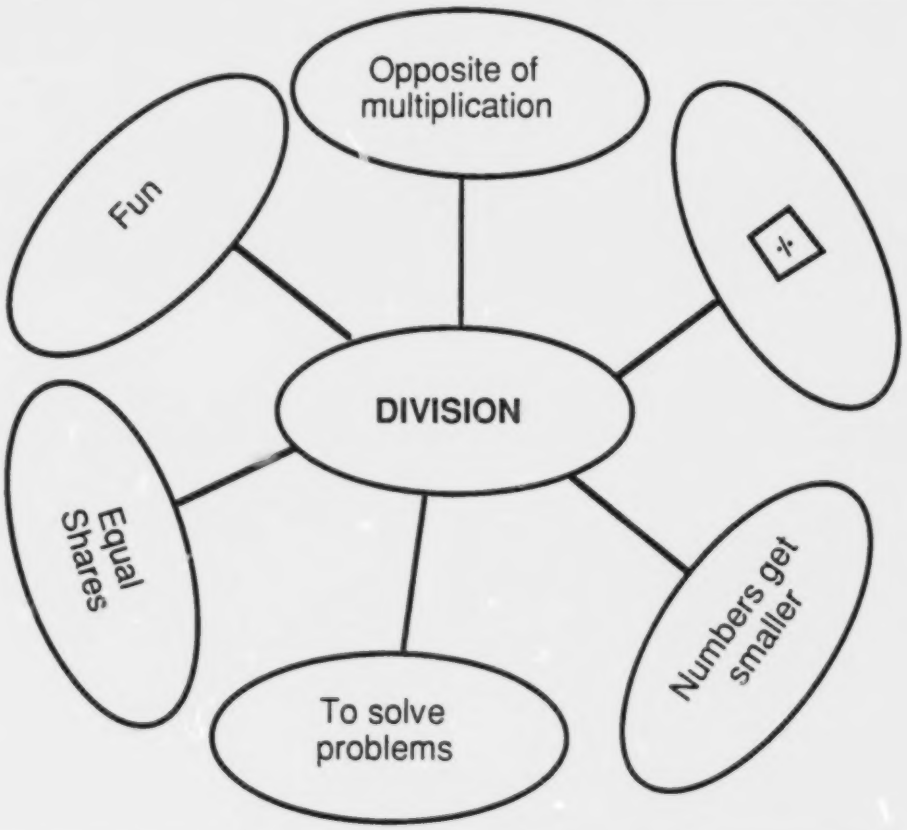
- **EVALUATION:**



How did you use your calculator to solve the problems?
What is division?
Make a network of all the words you can think of for division.

Sample

Name _____



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HOW MANY HANDFULS? RECORD SHEET 1

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Name_____

HOW MANY HANDFULS? RECORD SHEET 2

PROBLEMS:

Show your work:

1.

If there are 28 pieces of popcorn in a bag and each person gets 4, how many people will get a handful of 4 pieces?

Answer: _____

Show your work:

2.

If there are 35 pieces of popcorn in a bag and each person gets 7, how many people will get a handful of 7 pieces?

Answer: _____

Show your work:

3.

If there are 45 pieces of popcorn in a bag and each person gets 5, how many people will get a handful of 5 pieces?

Answer: _____

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BOB'S BIRTHDAY PARTY

GRADE: 1 - 2

STRAND: NUMBER

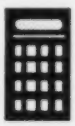
SKILL: Division: Given the quantity of objects and the number in each group, find the number of groups in a problem solving situation.

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Half-hour

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each student
- Bob's Birthday Party Record Sheets
- Crayons
- Pencil

VOCABULARY: Quantity, equal groups, division, ÷ key

PREREQUISITE SKILLS: Completion of Lesson 26

LESSON

- **DIRECTED INSTRUCTION:**

1. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Distribute a calculator and Bob's Birthday Party Record Sheets to each student.			
Read the story on Bob's Birthday Party Record Sheet page 1: **Bob is having a birthday party. There will be 6 people at this party. Help him shop at the market so that he will have enough food for everyone.**	How many people will be at the party?	6	Write 6 on the record sheet page 1.

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TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Summarize: "When Bob goes shopping, he needs to remember to choose packages or containers that have enough food for exactly 6 people.	Read the first problem: **Each person needs 4 hot dogs. Hot dogs come in 3 different packages. Which package should Bob buy?**	Guess which package Bob should buy so that each person at the party will get 4 hot dogs: • 24 hot dogs • 12 hot dogs • 36 hot dogs	
Ask these questions to help students solve <u>problem 1</u>:	What kind of food is Bob shopping for?	Hot dogs	Write <u>Hot dogs</u> on the record sheet in the chart under problem 1.
	How many hot dogs are in each package?	12, 24 and 36	Write 12, 24 and 36 on the record sheet under Total Amount.
	How can you use the calculator to find out which package of hot dogs Bob should buy?	Divide 24,12 and 36 by 4 (the number of hot dogs each person will get) to find out which package will give enough hot dogs for exactly 6 people.	Use the calculator to find the answer and record the results. *<u>Remind them that 6 is the answer they are looking for after they divide because Bob is shopping for 6 people.(see answer key)</u>
	Which package should Bob buy? Why?	The package of 24, so that all 6 people will get 4 hot dogs.	
			Continue this activity following the same steps. Students can work independently or in pairs.

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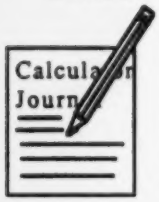
2. Answer Key:

1. Each person needs 4 hot dogs.
   Hot dogs come in 3 different packages.
   Which package should Bob buy?

Packages		
24 Hot dogs	12 Hot dogs	36 Hot dogs

Food	Quantity	+	How much will each person eat?	=	How many people at the party?	Is there enough food for exactly 6 people? Write yes or no.
Hot dogs	24	+	4	=	6	yes
	12	+	4	=	3	no
	36	+	4	=	9	no

- **EVALUATION:**



How did you use your calculator to solve the problems?

How did you know if there was enough food for exactly 6 people?

Make a list of food that Bob needs to buy at the market for his birthday party.

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NAME _____

BOB'S BIRTHDAY PARTY

Bob is having a birthday party. There will be 6 people at his party. Help him shop at the market so that he will have enough food for everyone.

DIRECTIONS:

1. Read each problem.
2. Complete the chart.
3. Use your calculator to solve the problem.
4. Color the number that tells what Bob should buy.

How many people will be at the party? ☐

1. Each person needs 4 hot dogs.
Hot dogs come in 3 different packages.
Which package should Bob buy?

Packages

Food	Quantity	+	How much will each person eat?	=	How many people at the party?	Is there enough food for exactly 6 people? Write yes or no.

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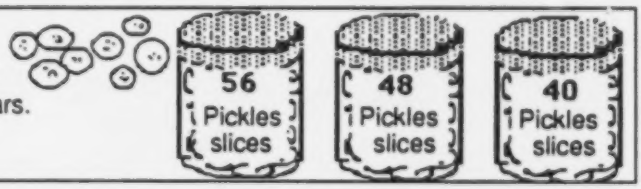
How many people will be at the party? ☐

2. Each person needs 7 olives.
Olives come in 3 different cans.
Which can should Bob buy?

Food	Quantity	+	How much will each person eat?	=	How many people at the party?	Is there enough food for exactly 6 people? Write yes or no.

3. Each person needs 8 pickle slices.
Sliced pickles come in 3 different jars.
Which jar should Bob buy?



Food	Quantity	+	How much will each person eat?	=	How many people at the party?	Is there enough food for exactly 6 people? Write yes or no.

How many people will be at the party? ☐

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4. Each person needs 5 cheese slices.
Sliced cheese comes in 3 different packages.
Which package should Bob buy?

Food	Quantity	+	How much will each person eat?	=	How many people at the party?	Is there enough food for exactly 6 people? Write yes or no.

5 Each person needs 3 scoops of frozen yogurt.
Frozen yogurt comes in 3 different containers.
Which container should Bob buy?

Food	Quantity	+	How much will each person eat?	=	How many people at the party?	Is there enough food for exactly 6 people? Write yes or no.

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CALCO ELECTRONICS - PART 1

GRADE: 2

STRAND: NUMBER

SKILL: Division: Given the quantity of objects and the number of groups, find how many in each group.

MANAGEMENT

CLASS ORGANIZATION: Groups of four

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator or calculator transparency
- Calculator for each student
- Calc Dollars transparency (cut out calc dollars)
- Calc Dollars Sheet (2 pages per each group of 4 students)
- Calc Dollar Problems Record Sheet
- **Calco Electronics Inc. Record Sheets- (save these sheets for Calco Electronics Part 2)**
- Pencil
- Scissors
- Green crayon (Optional - Color Calc Dollars)

VOCABULARY: Division, quantity, [÷] key

PREREQUISITE SKILLS: Completion of Lessons 26 - 27.

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LESSON

- **DIRECTED INSTRUCTION:**

1. **Teacher places Calc Dollars on the overhead projector and says:** "I have 12 Calc Dollars to divide evenly among 3 people.

2. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS
	How could we find out how many Calc Dollars to give each person so that each will get the same amount?	Brainstorm ideas: • Divide dollars into 3 piles • Use the calculator
Choose 3 students to stand in front of the room and distribute the	How many Calc Dollars does each child have?	4
Calc Dollars: first distribution: ☐ ☐ ☐ each child has 1 dollar second distribution: ☐ ☐ ☐ each child has 2 dollars third distribution: ☐ ☐ ☐ each child has 3 dollars fourth distribution: ☐ ☐ ☐ each child has 4 dollars All the money has been distributed.		
Summarize: We started with 12 Calc Dollars and we divided them equally among 3 people and found out that each person got 4 Calc Dollars.		

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3. Follow these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Divide students into groups of four and distribute • 4 calculators • 2 Calc Dollar pages • scissors • crayons (optional) 			
Tell each group of students to cut out the money on their Calc Dollar pages and count their Calc Dollars.	How many Calc Dollars do you have?	20 Calc Dollars.	
Ask these questions:	How many Calc Dollars do you think each person will get if you divide them equally in your group of four?	Students guess how many Calc Dollars each person will get.	Divide the money so that each person in the group of four gets the same number of Calc Dollars.
	How many Calc Dollars did each person get?	5 Calc Dollars.	
	How did you get your answer?	We started with 20 Calc Dollars and we divided them equally among 4 people and found that each person got 5 Calc Dollars.	

4. Follow these steps to use the calculator to show how we divided a quantity of Calc Dollars equally among 4 people:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS
	How many Calc Dollars did you start with?	20
Enter 20 into your calculator.	How many people in your group got Calc Dollars?	4
We divided the money equally among 4 people so press [÷] and then enter [4].		
Press [=] to find out how much money each person got.	How much money did each person get?	5 Calc Dollars.

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5. Summarize:

20	÷	4	=	5
Quantity of Calc Dollars	Divided by	Number of people to receive an equal amount of Calc Dollars		Number of Calc Dollars for each person

- **GUIDED PRACTICE:**

6. For practice using the division key have students solve these problems on the Calc Dollar Problems Record Sheet:

Answer Key:

ASK THESE QUESTIONS	POSSIBLE ANSWER
If I had 20 Calc Dollars, how could I divide them so that 5 people would get the same amount?	20 (Quantity of Calc Dollars) ÷ (Divided by) 5 (Number of people to receive an equal amount of Calc Dollars) = 4 (Number of Calc Dollars for each person)
If I had 20 Calc Dollars, how could I divide them so that 2 people would get the same amount?	20 (Quantity of Calc Dollars) ÷ (Divided by) 2 (Number of people to receive an equal amount of Calc Dollars) = 10 (Number of Calc Dollars for each person)
If I had 20 Calc Dollars, how could I divide them so that 20 people would get the same amount?	20 (Quantity of Calc Dollars) ÷ (Divided by) 20 (Number of people to receive an equal amount of Calc Dollars) = 1 (Number of Calc Dollars for each person)

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- **INDEPENDENT PRACTICE:**

7. For more practice use the Calco Electronic Inc. Record Sheets. Follow these steps to model this activity:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Read the story: **Calc Kid owns Calco Electronics Inc. He is trying to get a shipment ready to send to Tronic City. Help Calc Kid decide how many items to pack in each box so that he can fit them on the truck.**			
Tell students to look at problem 1 on their record sheet and read: There are 500 calculators. We have 10 boxes. How many Calculators will be packed in each box?	How many calculators are there?	500	Write: 500 Quantity
	How many boxes?	10	Write: 10 Number of boxes
	What do we want to find out?	We want to find out how many calculators will be packed in each box.	
	How can we use the calculator to solve the problem?	• Enter 500 (number of calculators) • Press [÷] 10 (the number of boxes) • Press [=] to find out how many calculators will be packed in each box.	Use the calculator and record the results for problem 1.
	How many calculators will be packed in each box?	50 calculators will be packed in each box.	Continue this activity following the same steps.

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ANSWER KEY: CALCO ELECTRONICS INC.

1. There are [300]

We have [10] boxes.

How many will be packed in each box? [50] answer

[500]	÷	[10]	=	[50]
Quantity		Number of boxes		Number in each box

2. There are [40] boxes in the T.V. room.

We must pack [160]

How many will be packed in each box? [4]

Answer

[160]	÷	[40]	=	[4]
Quantity		Number of boxes		Number in each box

3. There are [384] and [16] boxes.

How many will go in each box? [24]

Answer

[384]	÷	[16]	=	[24]
Quantity		Number of boxes		Number in each box

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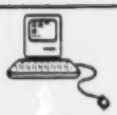
4.

There are [192] 

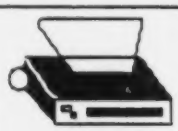
We have [32] boxes.

How many will be packed in each box? [6]

Answer

192	÷	32	=	6
Quantity		Number of boxes		Number in each box

5.

There are [24] boxes for [192] 

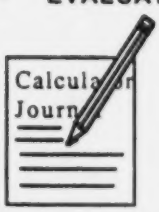
How many will go in each box? [8]

Answer

192	÷	24	=	8
Quantity		Number of boxes		Number in each box

* Ask this question to discuss problems 4 and 5: "Why do you think you got a different answer in each problem when you started out with the same quantity?

- **EVALUATION:**



How did you use your calculator to solve the problems?

What is division?

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Name _____

CALC DOLLAR PROBLEMS

1. **If I had 20 Calc Dollars, how could I divide them so that 5 people would get the same amount?**

Answer: _____

Show your work:

2. **If I had 20 Calc Dollars, how could I divide them so that 2 people would get the same amount?**

Answer: _____

Show your work:

3. **If I had 20 Calc Dollars, how could I divide them so that 20 people would get the same amount?**

Answer: _____

Show your work:

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NAME:_____

CALCO ELECTRONICS INC. RECORD SHEET

Calc Kid owns Calco Electronics Inc. He is trying to get a shipment ready to send to Tronic City. Help Calc Kid decide how many items to pack in each box so that he can fit them on the truck.

1. There are 500

We have 10 boxes.

How many will be packed in each box? ____ Answer

____	÷	____	=	____
Quantity		Number of boxes		Number in each box

2. There are 40 boxes in the T.V. room.

We must pack 160

How many will be packed in each box? ____ Answer

____	÷	____	=	____
Quantity		Number of boxes		Number in each box

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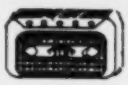
CALCO ELECTRONICS INC. RECORD SHEET

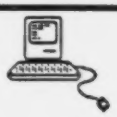
3.

There are [384]  and [16] boxes.

How many will go in each box? ☐ Answer

☐ Quantity ÷ ☐ Number of boxes = ☐ Number in each box

4.

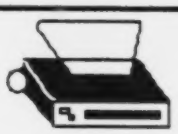
There are [192] 

We have [32] boxes.

How many will be packed in each box? ☐ Answer

☐ Quantity ÷ ☐ Number of boxes = ☐ Number in each box

5.

There are [24] boxes for [192] 

How many will go in each box? ☐ Answer

☐ Quantity ÷ ☐ Number of boxes = ☐ Number in each box

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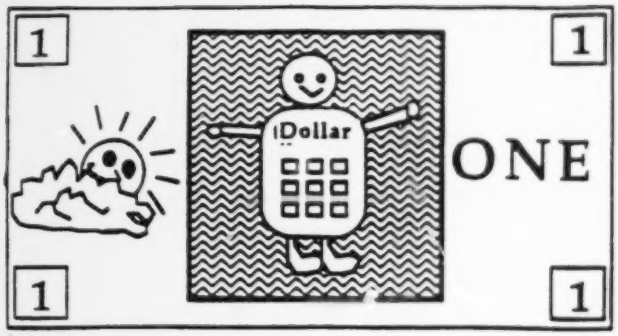
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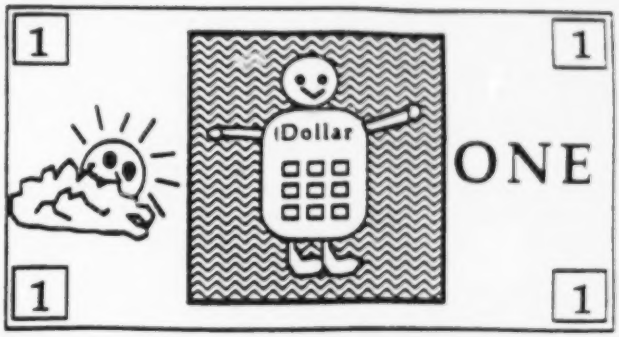
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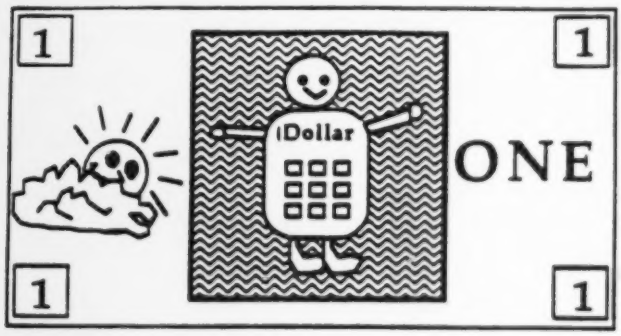
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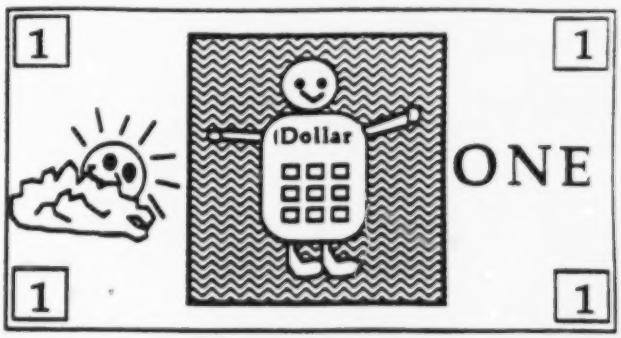
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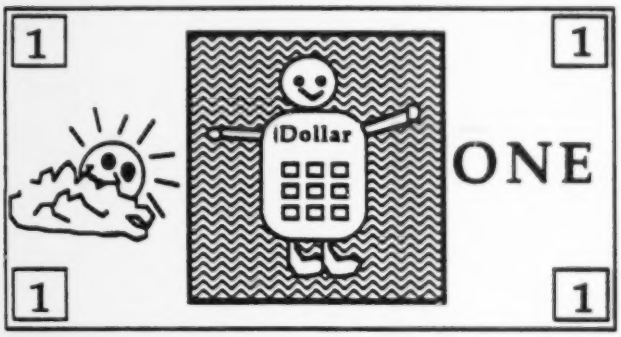
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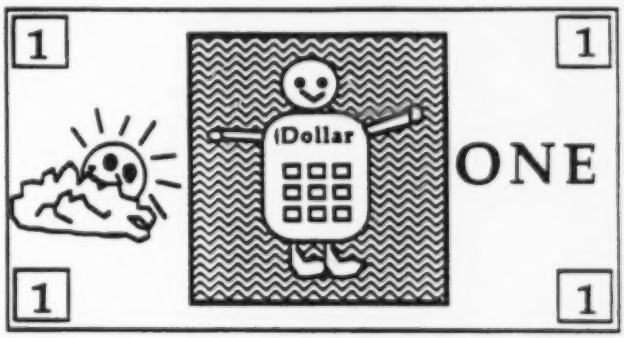
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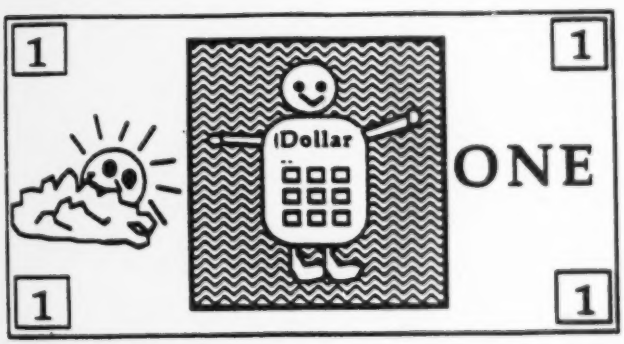
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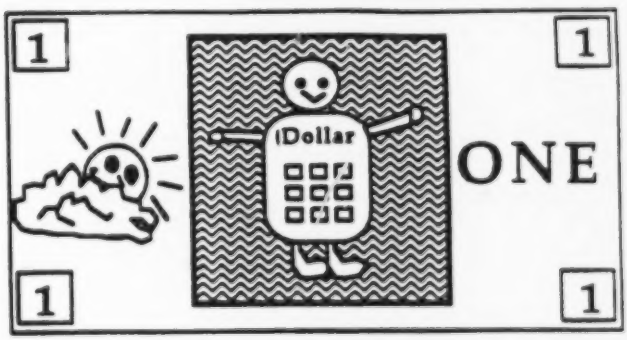
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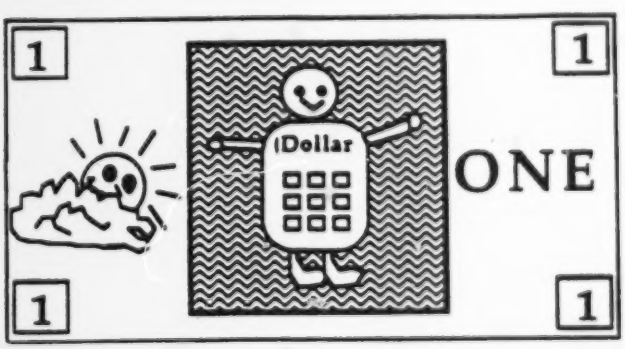
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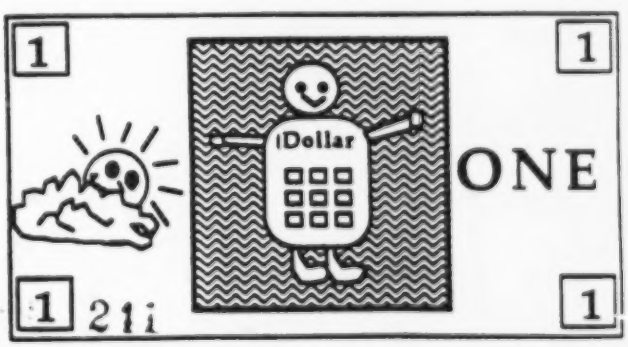
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CALCO ELECTRONICS - PART 2

GRADE: 2

STRAND: NUMBER

SKILL: Choose the operation(s) [+], [-], [x], [÷] in problem solving situations.

MANAGEMENT

CLASS ORGANIZATION: Total class

TIME FRAME: Half-hour

MATERIALS:

- Overhead calculator or calculator transparency
- Calculator for each student
- **Calco Electronics Inc.** Record Sheet (from Calco Electronics - Part 1 lesson)
- Calco Electronics Invoice Record Sheet
- Pencil

VOCABULARY: Addition, subtraction, multiplication, division, pounds (lbs), weigh, thousand

PREREQUISITE SKILLS: Concept of addition, subtraction, multiplication and division. Completion of Lesson 28.

LESSON

- **DIRECTED INSTRUCTION:**

1. Teacher says: "Calc Kid packed all the boxes to be sent to Tronic City. Now his job is to check to make sure all the items are on the truck before the shipment is delivered to Tronic City."

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2. Follows these steps:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Divide students into pairs and distribute: • 2 calculators • Calco Electronics Inc. Record Sheets • Calco Electronics Invoice Record Sheet. 			
The first thing we need to do is give Calc Kid all the information we recorded on our Calco Electronics Inc. Record Sheets so he can complete the invoice.*Explain the use of an invoice. Perhaps you can get a sample of a real invoice sheet to show them. (Check the school office)			Complete Part A of the Invoice Record Sheet by transferring the information from the Electronics Inc. Record Sheet (from Calco Electronics Part One.)
Now that Calc Kid has the information we recorded, let's help him complete Part B of the Calco Electronics Invoice Record Sheet. As we read each problem, let's think about how we can use the calculator to find the answer.			
Read problem 1: "How many items were sold?"	Where do we need to look in part A to find the information you need to solve the problem?	Look at the numbers in the boxes next to QUANTITY.	

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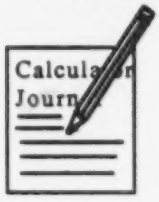
TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	How can you use the calculator to find the answer to problem 1?	Use the [+] to add the numbers: 500 [+] 160 [+] 384 [+] 192 [+] 192 [=]	Use the calculator to find the answer. Color in the [+] key on the record sheet to tell the operation used and record the answer: 1428. Write initials next to the answer to show that the problem has been completed.
Follow the same procedure for problem 2 to 6 (see answer key). This activity can continue as a directed lesson or students can work in pairs.			Write the date and a signature at the top of the page when the invoice has been completed.

3. Invite the school principal or office manager to come into the classroom and explain the process of how supplies are ordered and delivered to your school. (Perhaps students can watch the truck deliver supplies to school sometime.)

- **EVALUATION:**



How did you know which operation to use?

How did you use the calculator to solve the problem?

Does your answer make sense?

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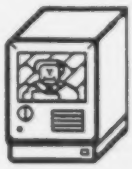
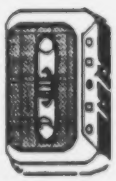
ANSWER KEY

CALCO ELECTRONICS INC.
1211211 E. KEYBOARD CIRCLE
CONSTANTVILLE, CALCORADO 900009
(000)555-6666 EXT 7778888

INVOICE NO. 33445566778899
COMPANY: TRONIC CITY
DATE SENT OUT: _____
SIGNATURE: _____

PART A

ITEM:					
Quantity:	500	160	384	192	192
Number of boxes:	10	40	16	32	24
Number in each box:	50	4	24	6	8

	PART B	How did you use the calculator?	Answer	Initial
1	How many items were sold?	[+]	1428	
2	How many boxes were loaded on the truck?	[+]	122	
3	How many boxes were loaded on the truck that did not hold any computers?	[+] or [-]	90	
4	One TV weighs 12 lbs. How much would one box of TV's weigh?	[x]	48	
5	How much would all 40 boxes of TV's weigh?	[x]	1920	
6	One box of computers weighs 132 lbs. How much would one computer weigh?	[+]	22	

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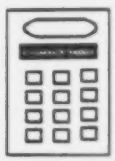
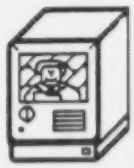
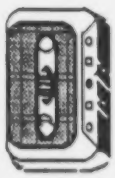
CALCO ELECTRONICS INC.
1211211 E. KEYBOARD CIRCLE
CONSTANTVILLE, CALCORADO 900009
(000)555-6666 EXT 7778888

INVOICE NO. 33445566778899
COMPANY: TRONIC CITY
DATE SENT OUT: _____
SIGNATURE: _____

PART A

ITEM:					
Quantity:					
Number of boxes:					
Number in each box:					

	PART B	How did you use the calculator?	Answer	Initial
1	How many items were sold?	[+] [-] [x] [÷]		
2	How many boxes were loaded on the truck?	[+] [-] [x] [÷]		
3	How many boxes were loaded on the truck that did not hold any computers?	[+] [-] [x] [÷]		
4	One TV weighs 12 lbs. How much would one box of TV's weigh?	[+] [-] [x] [÷]		
5	How much would all 40 boxes of TV's weigh?	[+] [-] [x] [÷]		
6	One box of computers weighs 132 lbs. How much would one computer weigh?	[+] [-] [x] [÷]		

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SOLVE THE MYSTERY

GRADE: 2

STRAND: NUMBER

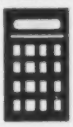
SKILL: Find squares and whole number square roots of numbers.

MANAGEMENT

CLASS ORGANIZATION: Pairs

TIME FRAME: Two half-hour sessions

MATERIALS:



- Overhead calculator or calculator transparency
- 1" tile squares or construction paper - 55 per pair of students
- Calculator for each student
- *Solve the Mystery Record Sheet*
- *Detective's Record Sheet*
- *Paper Squares Sheet*
- *Case Summary Record Sheet*
- *Case Summary Extension Record Sheet*
- Detective's License
- Pencil
- Crayon
- Paste

VOCABULARY: Square, square number, across, down, square root, pattern, consecutive, odd

PREREQUISITE SKILLS: Number recognition, geometric concept of square, understanding of the concept of equal groups. Completion of Lesson 24.

LESSON

- **DIRECTED INSTRUCTION: Session 1**

The purpose of session 1 is to gather data that will be used in session 2 when the concept of square root is introduced.

1. **Teacher says:** "Today, we are all going to be detectives and solve a mystery. There are some square numbers hiding out in this building (Show Solve the Mystery Record Sheet.) Your assignment as detectives is to find the square numbers. But first, let's look at some clues that will help us solve the mystery.

ASK THESE QUESTIONS:	POSSIBLE ANSWERS:
What is a square?	A shape with 4 equal sides and 4 equal corners.
What is a square number?	Have students brainstorm ideas to suggest answers to these questions, but don't give any response, yet. Let them know that they will be conducting some experiments to discover what square numbers are.
Which are the square numbers?	

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2. Follow these steps to help students discover the square numbers:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Divide students into pairs and distribute: • 55 tiles • Solve the Mystery Record Sheet • Detective's Record Sheet • Paper Squares Sheet • Scissors • Paste • Crayon			
Place one tile on the overhead projector and tell each student to get one tile.	Can you make a square when you use one tile?	Yes	Color and cut one square from the Paper Squares Sheet and glue on the Detective's Record Sheet to show that you can make a square using one tile.
Place two tiles on the overhead projector and tell each student to get two tiles.	Can you make a square when you use two tiles?	No	
Place three tiles on the overhead projector and tell each student to get three tiles.	Can you make a square when you use three tiles?	No	
Place four tiles on the overhead projector and tell each student to get four tiles.	Can you make a square when you use four tiles?	Yes	Color and cut four squares from the Paper Squares Sheet and glue on the Detective's Record Sheet to show that you can make a square using four tiles.
Continue in the same manner for the rest of the numbers to 25. (See Answer Key) * This lesson can continue as a directed lesson or have students work in pairs.			

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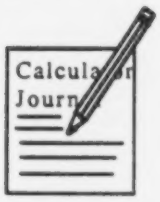
3. EVALUATION:

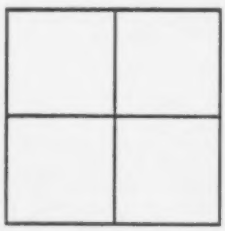


ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Which numbers were square numbers?	1,4,9,16 and 25	Students color in the boxes on their Solve The Mystery Record Sheet that show the square numbers.
How do you know that they are square numbers?	They have the same number of squares on each side.	

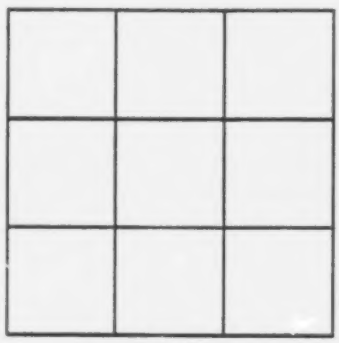
Answer Key

Detective's Record Sheet
Can you make a square?

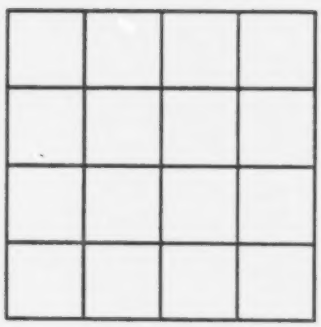
1 tile



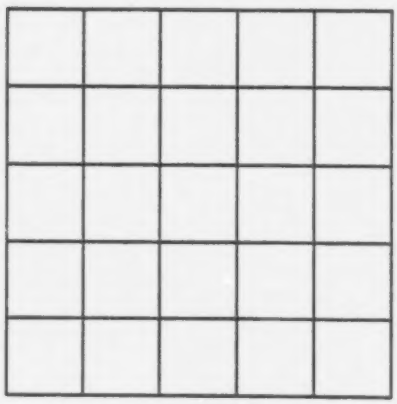
4 tiles



9 tiles



16 tiles



25 tiles

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- **DIRECTED INSTRUCTION: SESSION 2**

1. Students need to complete columns A to E on Part One of the Case Summary Record Sheet using information from the Detective's Record Sheet and Solve the Mystery Record Sheet. (Smallest to largest square number)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Tiles Across	1	2	3	4	5									
Tiles Down	1	2	3	4	5									
Square Number	1	4	9	16	25									

2. Ask students to look for patterns on the chart.
Discuss the patterns that they find:

-The numbers in the Tiles Across row and Tiles Down row are the same in each column.
-The numbers in the Tiles Across and Tiles Down rows are consecutive.
-The pattern in the Square Number row increases by adding consecutive odd numbers. For example $1 + \underline{3} = 4$ $1 + 3 + \underline{5} = 9$

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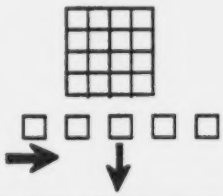
3.

Distribute a calculator to each student.
Tell students to look at the 4 by 4 grid on Part Two of the Case Summary Record Sheet and then follow these steps:



TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
	How many tiles are across? →	4	Record a 4 above the across arrow. It should look like this: [4] □ □ = □ → ↓
	How many tiles are down? ↓	4	Record a 4 above the down arrow. It should look like this: [4] □ [4] = □ → ↓
	What is the square number?	16	Record the 16 after the [=] : [4] □ [4] = [16] → ↓
	How could we use the calculator to get 16 as an answer using 4 and 4?	4 x 4 = 16	Use the calculator to check. Then complete the equation: [4] [x] [4] = [16] → ↓
Follow the same steps using the 5 by 5 grid on part two of the Case Summary Record Sheet.	How did we use the calculator to get 25 as an answer using 5 and 5?	5 x 5 = 25	
	How could we use the calculator to find out what the next square number would be?	• Enter [6] • Press [x] • Press [6] • Press [=]	Use the calculator to check. Record the information in column F on the Case Summary Record Sheet. [F] [6] [6] [36]
			Complete the chart on the Case Summary Record Sheet following the same steps and discuss results.

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ANSWER KEY

F	G	H	I	J	K	L	M	N
6	7	8	9	10	11	12	13	14
6	7	8	9	10	11	12	13	14
36	49	64	81	100	121	144	169	196

4. Tell students to cover the Tiles Across and Tiles Down row on their chart so that only the list of square numbers is showing:

1	4	9	16	25	36	64	81	100

5. Teacher says, "I'm going to share another mystery with you. See if you can solve this one."

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS
Enter 25 into your calculator. Press the $\sqrt{\ }$ (square root) key.	What number do you see on your display?	5
Now look back at your chart on Part One of the Case Summary Record Sheet.	What number do you see in column E above 25?	5
Clear your display. Now enter 49 into your calculator. Press the $\sqrt{\ }$ (square root) key.	What number do you see on your display?	7
Look back at your chart again.	What number do you see in column G above 49?	7
	What happens when you press the $\sqrt{\ }$ key?	You get the number of tiles across and down that you used to make your square.
The number 7 is called the square root of 49 which is the total number of tiles in your square.	What do you think will have if you use the $\sqrt{\ }$ key with the other squre numbers on your chart?	You will get the number of tiles across and down that you used to make a square.
* Remind students that this number is called the square root.		Experiment using the $\sqrt{\ }$ key.

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GUIDED PRACTICE:

6. Students can complete the Case Summary Extension Record Sheet.

The Case Summary Extension Record Sheet

Answer Key:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Tiles →	15	13	12	9	17	5	100	11	4	1	16	20	3	19
Tiles ↓	15	13	12	9	17	5	100	11	4	1	16	20	3	19
Square Numbers	225	169	144	81	289	25	10000	121	16	1	256	400	9	361

7. Award the Detective's License to students after they have completed the record sheets.

- **EVALUATION:** Have students discuss their results:

ASK THESE QUESTIONS	POSSIBLE ANSWERS
How did you use you calculator to find the square root?	Enter a square number. Press the $\sqrt{}$ key.
How can you check to see if you found the square root of a number?	Multiply that number by itself.
• What happens when you use the $\sqrt{}$ key with numbers that are not square numbers?	• Let studentss experiment with their calculator. (You will get a decimal number instead of a whole number on the calculator display.)

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Solve the Mystery

Detective _____

Can you find the square numbers?

Clue: Use tiles or paper squares to help you.

Color in the square numbers.				
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

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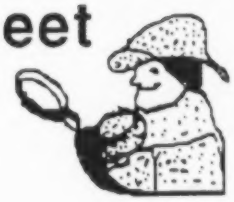
Detective's Record Sheet

Can you make a square?



Detective_____

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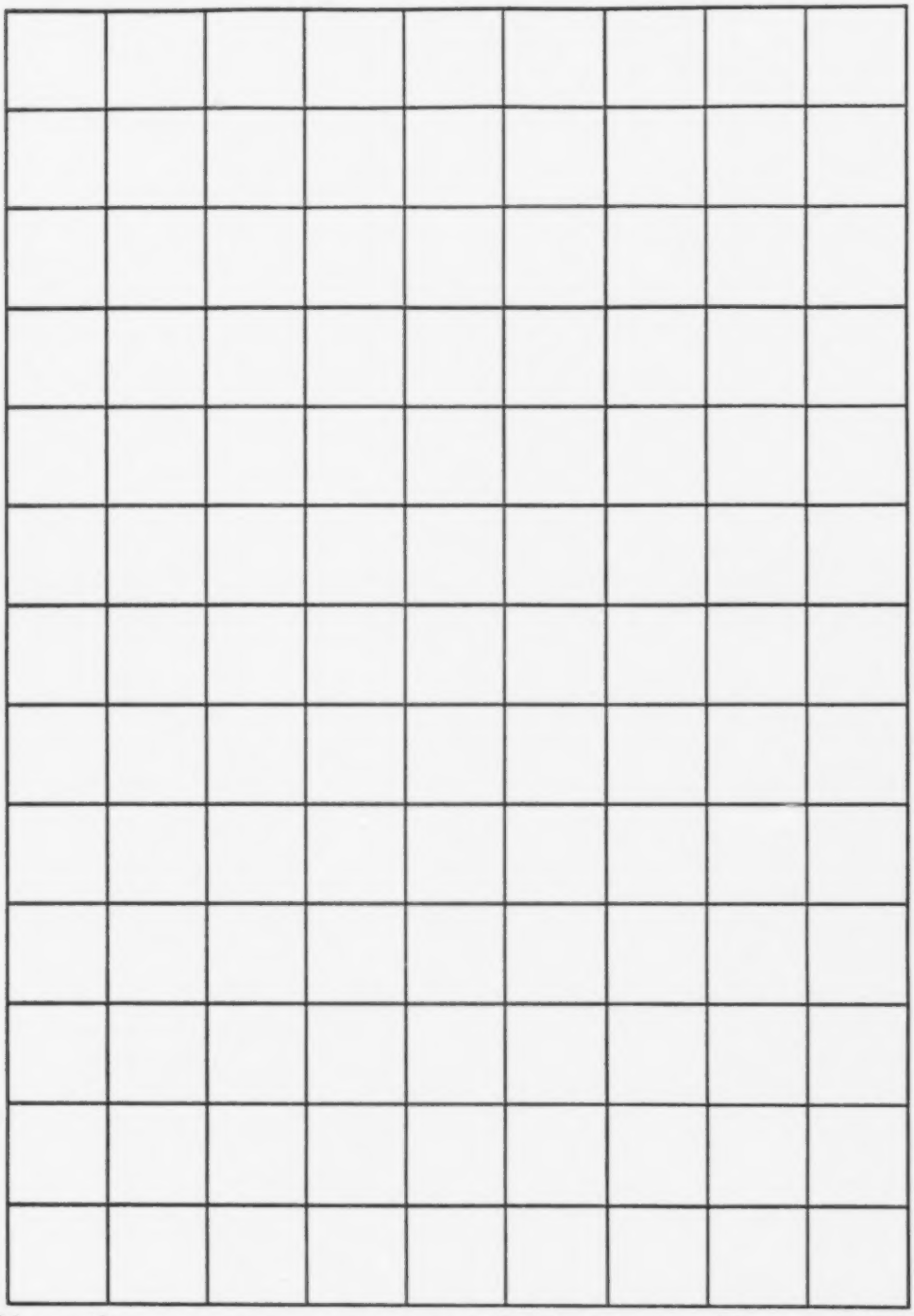
PAPER SQUARES

1. Cut out the squares to show your evidence.



2. Glue the squares on your Detective's Record Sheet

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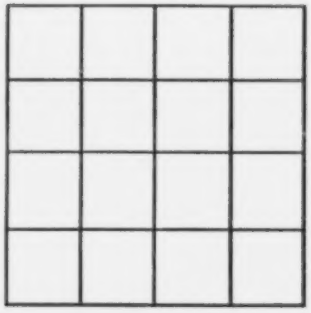
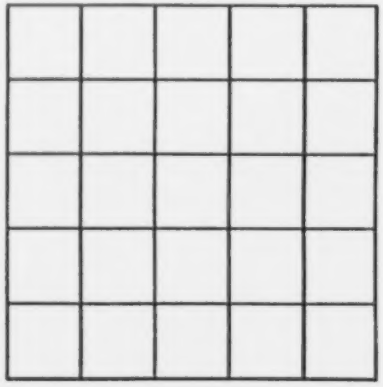
NAME _____

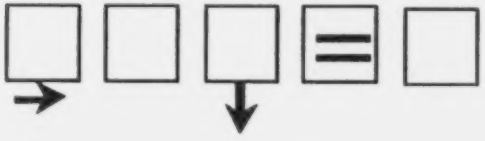
Part One: Case Summary Record Sheet

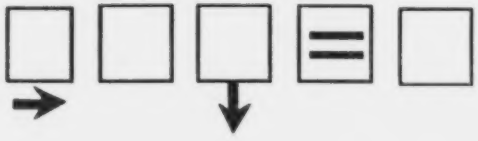
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Tiles →														
Tiles ↓														
Square Numbers														

Part Two:









Book 1: Grades K - 2
LESSON 30

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Detective _____

How well do you understand the mystery of square numbers and square root?

Clue: The square number 144 would show

_____tiles across and _____ tiles down.

The square root $\sqrt{\square}$ of 144 is ___.

Now you are ready to solve these mysteries.

	A	B	C	D	E	F	G
Tiles →					17		
Tiles ↓		13		9			100
Square Numbers	225		144			25	

	H	I	J	K	L	M	N
Tiles →							19
Tiles ↓						3	
Square Numbers	121	16	1	256	400		

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Detective's License

First Name Last Name

is a

Number One Mystery Solver

Instructor's signature

Detective's License

First Name Last Name

is a

Number One Mystery Solver

Instructor's signature

Detective's License

First Name Last Name

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Number One Mystery Solver

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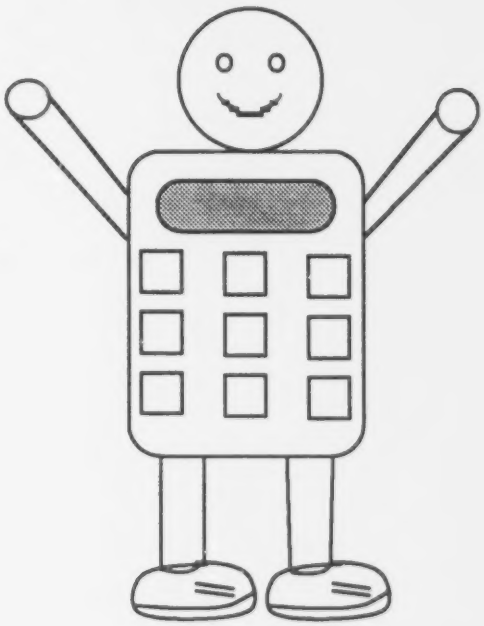
CALCULATORS AND MATHEMATICS PROJECT, LOS ANGELES

CHAPTER 4

ALGEBRA

K-2



TILES - R- US

GRADE: 2

STRAND: ALGEBRA

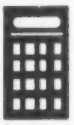
SKILL: Solve equations using the memory keys: [M+] and [MRC]

MANAGEMENT

CLASS ORGANIZATION: Total class, pairs

TIME FRAME: Two half-hour sessions

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each student.
- 1" tiles or construction paper squares - 50 per pair of students
- 1" graph paper - 4 sheets per pair of students
- Tiles - R - Us Interior Design Record Sheet
- Construction paper: 18 x 24 (1 sheet per pair of students)
- Crayons
- Scissors
- Glue
- Pencil

VOCABULARY: Equation, parentheses, square tile (unit of measurement), Memory Key [M+], [MRC]

PREREQUISITE SKILLS: Completion of Lessons 1 - 12 , 24.

LESSON

- **DIRECTED INSTRUCTION: SESSION 1**

The purpose of session 1 is to gather data that will be used in Session 2 to solve equations on the calculator.

1. Teacher says, "Calc Kid just bought a new house and he wants to put tiles on the floor of each room. He has already chosen the colors but he needs to find out how many square tiles of each color to buy. He went to TILES-R-US and these are the things they told him to do."

• Measure each room to find out how many square tiles will cover the floor. • Make a map of his house called a floor plan so that he will know exactly how many tiles to buy.

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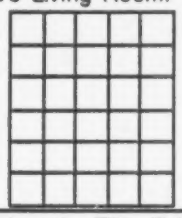
2. Follow these steps to help Calc Kid make a floor plan with the measurements from his house:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Divide students into pairs and distribute: • Tiles-R-Us Interior Decorator's Record Sheet • Tiles • 1" graph paper • Scissor • Crayons • Glue • Pencil			
Tell students to use their tiles to make a rectangle that is 6 rows of 5 and place it on the 1" graph paper to show the measurements of Calc Kid's Living Room: 	What are the measurements of his Living Room?	6 rows of 5 tiles or 6 x 5	Outline the rectangle with a black crayon, cut it out and label it: Living Room (6x5) * Put parentheses around 6x5.
Look at the Tiles R Us Interior Design Record Sheet Part A.	What color tiles does Calc Kid want to put in his Living Room?	blue	Color the rectangle blue.
Follow the same steps with the Den, Bedroom and Bathroom but model how to construct the rooms that are not rectangular.(Hall, Master Bedroom, Master Bathroom, Dining Room, Kitchen, Computer Room.)			

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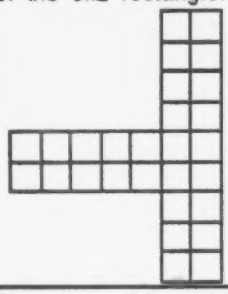
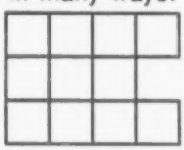
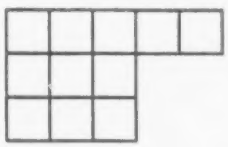
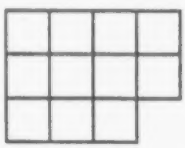
3. Follow these steps to make the hall

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Tell students to use their tiles to make a rectangle that is 9 rows of 2 tiles and place it on the 1" graph paper:			
Then have them make another rectangle that is 2 rows of 5 tiles and place it next to the 5th and 6th row of the 9x2 rectangle: 	What are the measurements of the two rectangles that make up the Hall?	(9x2) and (2x5)	
Since the hall is made up of two rectangles, this is how you write the equation for the measurements: (9x2) + (2x5) * The parenthesis are used to show the two parts of the Hall.			Outline the hall with a black crayon, color, cut and label: <u>Hall</u> (9x2) + (2x5)
Follow the same steps to complete the rest of the rooms. You can continue as a directed lesson or students can work in pairs.			

4. After students have constructed each room in Calc Kid's house, have them make a floor plan. (See sample floor plan) Students can glue their floor plan on 12" by 18" construction paper. * Allow them to be creative. *(3x3) + 2 room can be constructed in many ways:

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It is not necessary for all students to make the rooms look exactly the same as long as they have the same area.

- **EVALUATION:**

  Why did you use parenthesis in some of your equations?

- **DIRECTED INSTRUCTION: SESSION 2**

1. Follow these steps to complete Part B of the Tiles-R-Us Interior Design Record Sheet:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Students will continue to work in pairs. Distribute the following: • floor plan • Tiles-R-Us Interior • Design Record Sheet			
Now that we have completed Calc Kid's floor plan, we are ready to help him find out how many tiles of each color he needs to buy.			Look at Part B of the record sheet.
Ask these questions to help students complete the chart in part B.	What does the first column tell us?	What color tiles he wants for each room	
	What do you think we need to write in the Rooms column?	A list of the rooms in his house next to the color he has chosen.	List the rooms next to the color Calc Kid has chosen.
	What do you need to write in the Measurements: Equations column?	The measurements of the rooms for each color.	<table><tr><th>Room</th><th>Measurements</th></tr><tr><td>living room dining room</td><td>(6x5)+(4x4)+1</td></tr></table>
	How can we find out how many blue tiles are needed for the living room and dining room?	• Count the tiles on the floor plan. • Use the calculator.	Count the number of squares and record in the Number of Square Tiles column of the record sheet. (47)
Distribute a calculator to each student and tell them that they will learn how a salesperson at Tiles-R-Us would use the calculator to find the total number of tiles needed, instead of counting.			

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TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Tell students to look at the measurements for the Living Room and Dining Room. We used parentheses in our equation to remind us of all the parts of each room. When we use the calculator we will use some new keys to help the calculator remember each part that we enter separately. We call these memory keys [M+] [MRC] because they help the calculator remember things: just as your mind helps you remember things such as your phone number, address, age, etc. Ask these questions and model the procedure on the overhead calculator:	What is the first part of our equation?	(6x5)	Enter[6][x][5][M+].
	What is the next part of our equation?	(4x4)	Enter [4][x][4][M+].
	What is the last part of our equation?	+1	Enter [1][M+].
	Have we entered all the parts into the calculator?	yes	Press [MRC].
	What is the total number of blue tiles that we need?	47	
	Is this the same number we got when we counted the tiles?	yes	Press [MRC] again to clear the memory.

- **GUIDED PRACTICE:**
  2. Students are now ready to use the calculator to compute Part B of their record sheet instead of counting squares on their floor plan.

> * **Remind them to press [M+] each time they enter one part of the equation.**
>
> **Press [MRC] to find the total.**
>
> **Press [MRC] again to clear the memory.**

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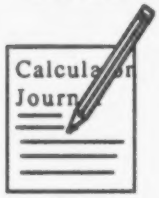
Answer Key:

Color	Room	Measurements: Equations	Number of Square Tiles
1. blue	Living Room Dining Room	(6x5) +(4x4) + 1	47
2. brown	Hall	(9x2) +(2x5)	28
3. green	Master Bedroom Bedroom	(3x5) +(2x2) + (3x5)	34
4. white	Master Bathroom Bathroom	(3x3) + 2 + (2x3)	17
5. yellow	Kitchen	(2x5) + 3	13
6. orange	Den Computer Room	(2x4) +(3x3) + (2x2)	21

- **EVALUATION:**



How did you use the calculator to solve each equation?

- **HOME ACTIVITY:**

Students can design their own floor plans and write equations to find the area (home, store, school, etc.)

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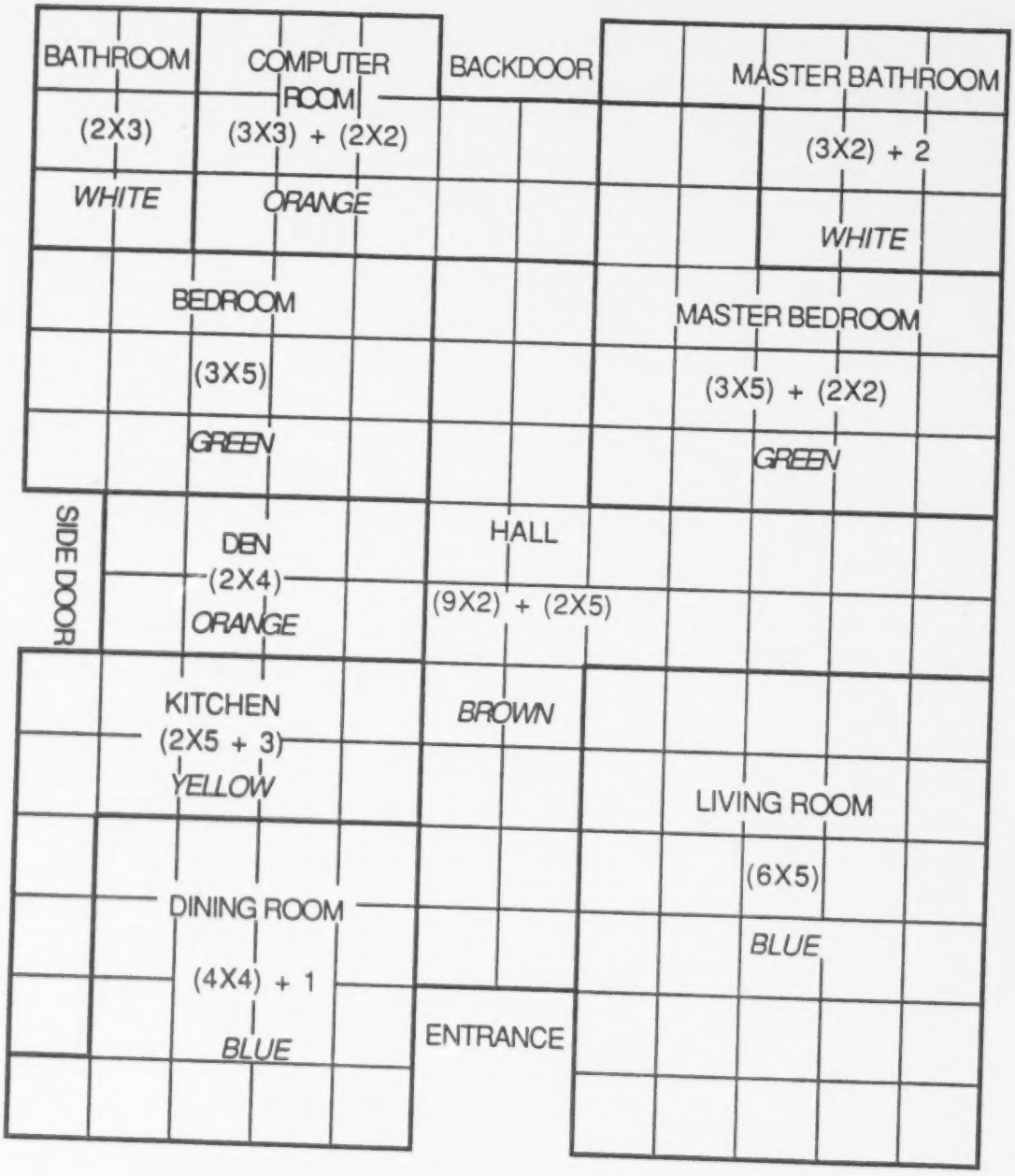
CALC KID'S FLOOR PLAN

ANSWER KEY



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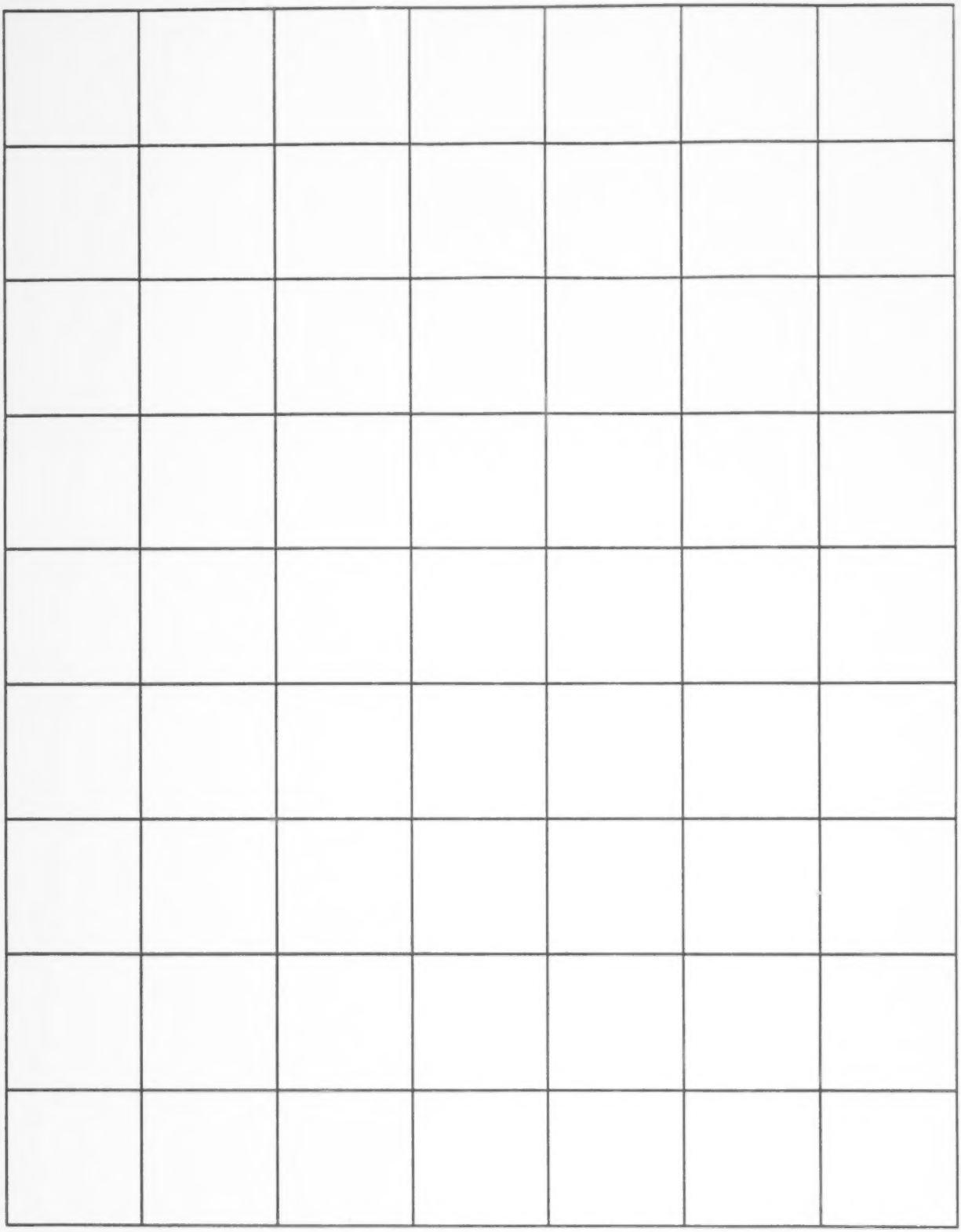

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Tiles-R-US Interior Decorator's Record Sheet

Name _____

Part A: Make the Floor Plan

1. Living Room (6x5) blue
2. Hall (9x2) + (2x5) brown
3. Master Bedroom (3x5) + (2x2) green
4. Master Bathroom (3x3) + 2 white
5. Dining Room (4x4) + 1 blue
6. Kitchen (2x5) + 3 yellow
7. Den (2x4) orange
8. Bedroom (3x5) green
9. Bathroom (2x3) white
10. Computer Room (3x3) + (2x2) orange

Part B: Find out how much of each color to order.

Color	Rooms	Measurements: Equations	Number of Square Tiles
1. blue			
2. brown			
3. green			
4. white			
5. yellow			
6. orange			

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THE STADIUM

GRADE: 2

STRAND: ALGEBRA

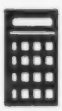
SKILL: Solve equations using the memory keys: [M-], [M+], and [MRC].

MANAGEMENT

CLASS ORGANIZATION: Pairs

TIME FRAME: Two forty minute sessions

MATERIALS:



- Overhead calculator or calculator transparency
- Calculator for each student
- World Stadium Seating Chart Record Sheet
- World Stadium Planning Sheet
- World Stadium Management Sheet
- World Stadium Home Activity Record Sheet
- 1" tiles or construction paper squares: 40 per pair of students
- Crayons
- Scissors
- Glue
- Pencil

VOCABULARY: Equation, parentheses, memory keys: [M+], [M-], [MRC]

PREREQUISITE SKILLS: Completion of Lesson 31

LESSON

- **DIRECTED INSTRUCTION:**
  1. Teacher says, "It is the day of the **Super Circus Extravaganza** at the **World Stadium**. Hundreds of school children have come from all over the county to attend this special event. Some children are already inside, while others are waiting to be escorted to their seats. Calc Kid is very busy in the ticket office assigning blocks of seats so that children from each school can be together. He needs our assistance to help him seat all the children before the circus begins."

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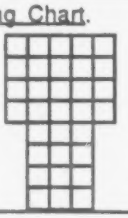
2. Follow these steps to complete the World Stadium Management Sheets:

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Divide students into pairs and distribute: • Calculator • World Stadium Seating Chart Record Sheet • World Stadium Planning Sheet • World Stadium Management Sheet • Tiles • Scissors • Crayons • Glue • Pencil			
"Look at the flag in Section AA on the World Stadium Seating Chart."	How many Students from Sun Valley School are already seated?	24	
Ask these questions to help Calc Kid find out if he has room to seat students from another school in section AA:	Look at the box at the bottom of the World Stadium Seating Chart. What is the seating arrangement for Section AA?	(4 x 5) + (4 x 3)	Write (4 x 5) + (4 x 3) on the World Stadium Planning Sheet in the **"Seating Arrangement" column.**
	Why did we use parentheses?	To show the two parts of Section AA.	
	How are the seats arranged?	4 rows of 5 seats and 4 rows of 3 seats.	Use the tiles to show how the seats are arranged. Then cut out the squares on the bottom of the World Stadium Management Sheet to show the two parts of Section AA. Glue them on the back of the World Stadium Seating Chart. 

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3. Follow these steps to complete the World Stadium Planning Sheet.

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Tell students to look at the World Stadium Seating Chart. Ask these questions to help students make seat assignments for each school.	Look at the Sun Valley School flag in section AA. How many seats are already taken in Section AA by the students from Sun Valley School?	24	Write 24 in the **"Number of Seats Taken"** column on the World Stadium Planning Sheet.
	What other information do you need to record in Section AA?	The number of seats available.	
	How can you use the memory keys to find the number of seats available?	• Enter the seating arrangement.	Press: [4] [x] [5] [M+] [4] [x] [3] [M+]
	What memory key should we use to subtract the number of seats taken?	[M-] to subtract and [MRC] to find the answer.	Press: 24 [M-] [MRC]
	How many seats are still available in Section AA?	8	• Write 8 in the **"Number of Seats Available"** column for Section AA. • Press [MRC] again to clear the memory. • Press [on/c] to clear the display.
	Can any of the schools listed in Part Y be assigned to Section AA?	No	
	Why not?	There are not enough seats left in Section AA.	

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4. Follow these steps to complete the World Stadium Seating Chart.

TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
"To help Calc Kid make seat assignments for the rest of the sections, we must glue the school flags in the right place on the World Stadium Seating Chart. Look at the flag in Section A on the World Stadium Seating Chart."	How many students from Lakeside School are already seated?	521	
Ask these questions to find out what other school will be seated in Section A:	Look at the box at the bottom of the World Stadium Seating Chart.		
	What is the seating arrangement for Section A?	(12 x 30) +(12 x 27)	Write (12 x 30) + (12 x 27) on the World Stadium Planning Sheet in the **"Seating Arrangement"** column.
	How are the seats arranged?	12 rows of 30 seats and 12 rows of 27 seats.	
	Look at the World Stadium Seating Chart. How many seats are taken in Section A?	521	Write 521 in the **"Number of Seats Taken"** column.
	What do we need to find out now?	The number of seats still available in Section A.	
	How can you use the memory keys to find the number of seats still available?	• Enter the seating arrangement. • Subtract the number of seats taken.	Press: 12 [x] 30 [M+] 12 [x] 27 [M+] Press: 521 [M-] [MRC]
	How many seats are still available in Section A?	163	Write 163 in the **"Number of Seats Available"** column for Section A.
	Which school should we assign to Section A?	Meadow School	

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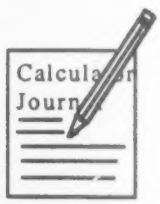
TEACHER DIRECTIONS	ASK THESE QUESTIONS	POSSIBLE ANSWERS	STUDENT DIRECTIONS
Ask this question to help students check the reasonableness of their selection.	Why is Meadow School a good choice for Section A?	It's the only section where all 156 children can sit together and have the fewest number of seats left over.	Write A in the **"Assigned Section"** column for Meadow School. Press [MRC] again to clear the memory and then [on/c]..
Place Meadow School in the correct section by following the directions on the top of the World Stadium Management Sheet.			Cut out the flag for Meadow School and glue it in Section A on the seating chart.

SESSION 2

- **GUIDED PRACTICE:**
  5. Students are now ready to use the calculator to solve the problem of assigning seats to all of the schools.

Remind them to press [M+] each time they enter one part of the equation into the memory. Press [M-] to subtract from the memory. Press [MRC] to find the answer. Press [MRC] again to clear the memory. Press [on/c] to clear the display.

- **EVALUATION:**



- What did the numbers in the parentheses mean?
- How did you use the calculator to solve the equations?

- **HOME ACTIVITY:**
  The World Stadium Home Activity Record Sheet is provided to give students additional experience using the memory keys to solve equations. In this activity students will find the total number of seats in each section and use the information to calculate the total number of seats in the World Stadium.

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Remaining lesson on McDraw II K-2/7.2 dr1-3

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NAME _____

WORLD STADIUM PLANNING SHEET

PART X: Find out how many seats are available so that you can assign seats for each school.

SECTION	SEATING ARRANGEMENT	NUMBER OF SEATS TAKEN	PRESS		NUMBER OF SEATS AVAILABLE
AA			[M-]	[MRC]	
A			[M-]	[MRC]	
B			[M-]	[MRC]	
C			[M-]	[MRC]	
D			[M-]	[MRC]	
E			[M-]	[MRC]	
F			[M-]	[MRC]	
G			[M-]	[MRC]	

PART Y: Make seat assignments for each school.

SCHOOLS WAITING TO BE SEATED	NUMBER OF STUDENTS	ASSIGNED SECTION
Rocky Road	350	
Harbor	312	
Meadow	156	
Park Lane	300	
Gulf	274	
Hilldale	169	

NAME _____

WORLD STADIUM SEATING CHART

SECTION	SEATING ARRANGEMENT
AA	(4 x 5)+(4 x 3)
A	(12x30)+(12x27)
B	(12x18)+(12x15)
C	(12x32)+(12x28)
D	(12x11)+(12x10)
E	(12x10)+(12x8)
F	(12x32)+(12x28)
G	(12x18)+(12x15)

ANSWER KEY

WORLD STADIUM PLANNING SHEET

PART X: Find out how many seats are available so that you can assign seats for each school.

SECTION	SEATING ARRANGEMENT	NUMBER OF SEATS TAKEN	PRESS		NUMBER OF SEATS AVAILABLE
AA	(4 x 5) + (4 x 3)	24	[M-]	[MRC]	8
A	(12 x 30) + (12 x 27)	521	[M-]	[MRC]	163
B	(12 x 18) + (12 x 15)	118	[M-]	[MRC]	278
C	(12 x 32) + (12 x 28)	327	[M-]	[MRC]	393
D	(12 x 11) + (12 x 10)	75	[M-]	[MRC]	177
E	(12 x 10) + (12 x 8)	216	[M-]	[MRC]	0
F	(12 x 32) + (12 x 28)	419	[M-]	[MRC]	301
G	(12 x 18) + (12 x 15)	79	[M-]	[MRC]	317

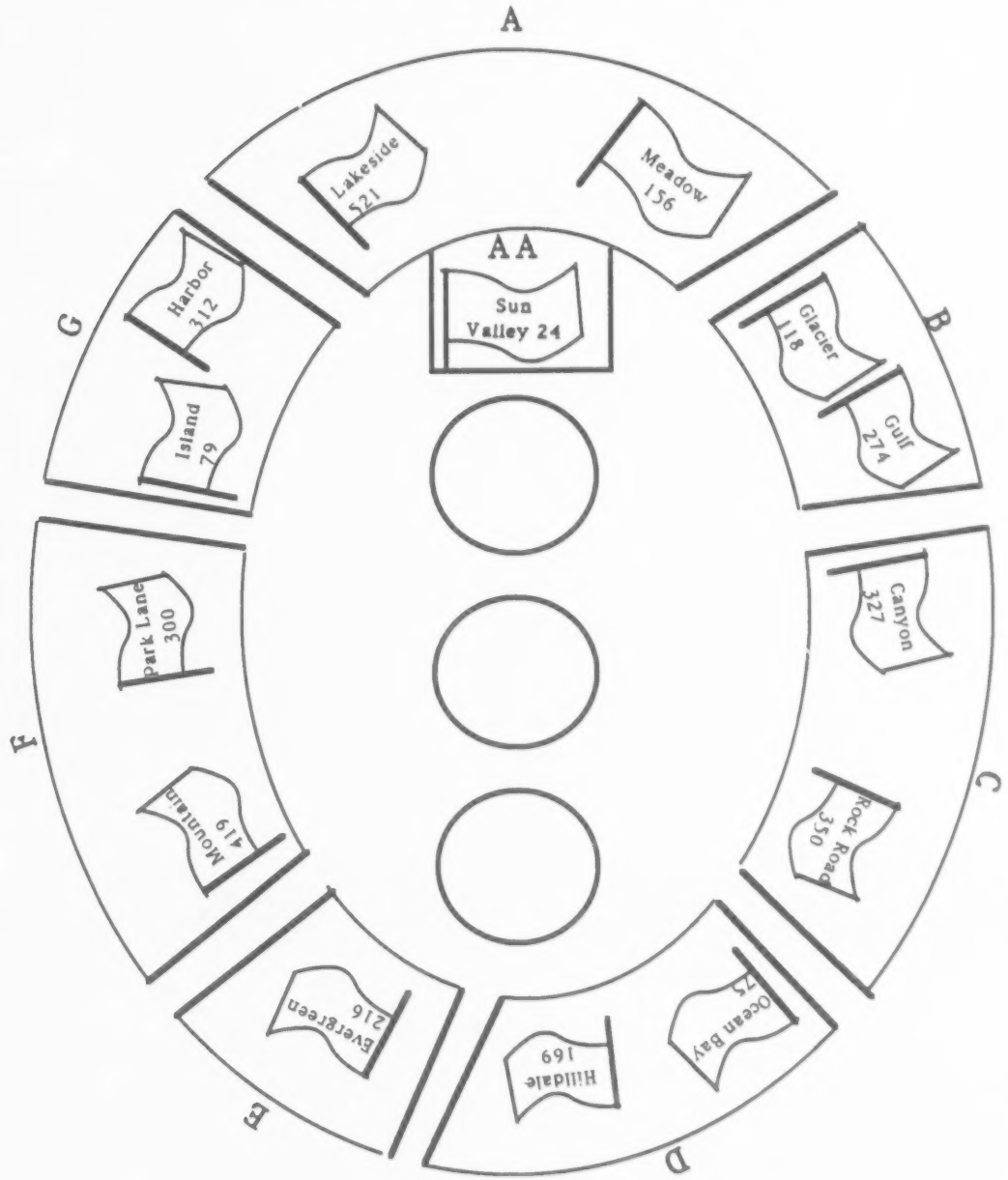
PART Y: Make seat assignments for each school.

SCHOOLS WAITING TO BE SEATED	NUMBER OF STUDENTS	ASSIGNED SECTION
Rocky Road	350	C
Harbor	312	G
Meadow	156	A
Park Lane	300	F
Gulf	274	B
Hilldale	169	D

Answer Key

NAME _____

WORLD STADIUM SEATING CHART



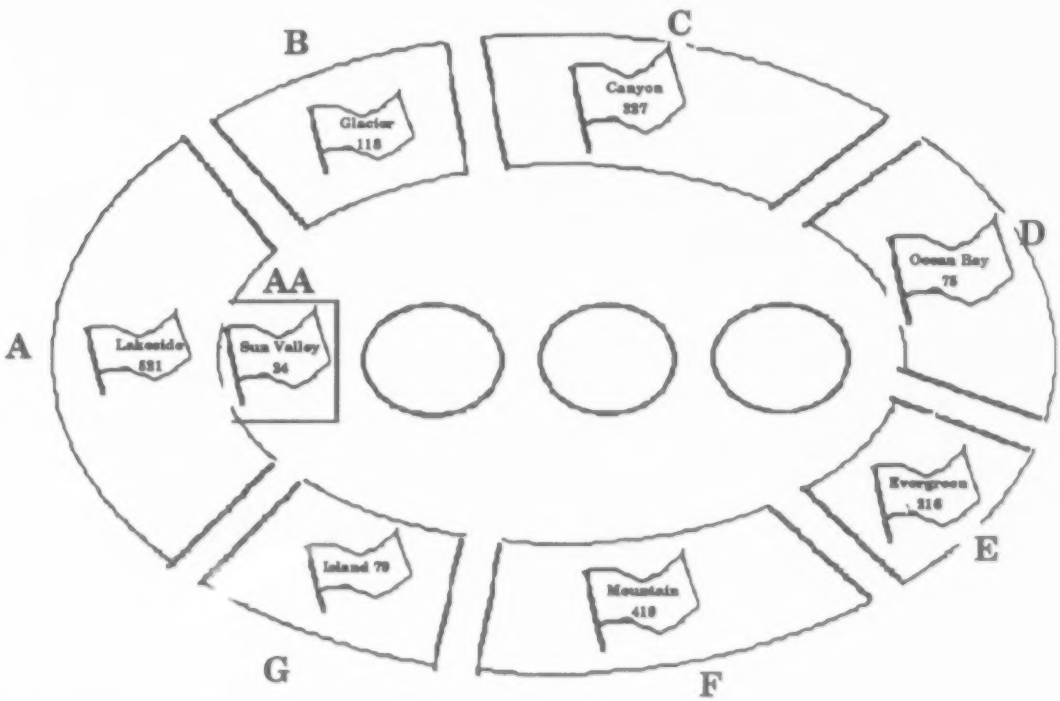
SECTION	SEATING ARRANGEMENT
AA	(4 x 5)+(4 x 3)
A	(12x30)+(12x27)
B	(12x18)+(12x15)
C	(12x32)+(12x28)
D	(12x11)+(12x10)
E	(12x10)+(12x8)
F	(12x32)+(12x28)
G	(12x18)+(12x15)

ANSWER KEY

NAME _____

WORLD STADIUM - HOME ACTIVITY

Directions: Use the memory keys on your calculator to complete the chart and answer the questions.



1. What is the total number of seats in each section?

   Hint: Enter the seating arrangement.
   Press [MRC] to see the total.
   Write the total on the chart.
   Press [MRC] again to clear the memory.
   Press [C] to clear the display.

SECTION	SEATING ARRANGEMENT	PRESS	TOTAL NUMBER OF SEATS
AA	(4 x 5)+(4 x 3)	[MRC]	32
A	(12x30)+(12x27)	[MRC]	684
B	(12x18)+(12x15)	[MRC]	396
C	(12x32)+(12x28)	[MRC]	720
D	(12x11)+(12x10)	[MRC]	252
E	(12x10)+(12x8)	[MRC]	216
F	(12x32)+(12x28)	[MRC]	720
G	(12x18)+(12x15)	[MRC]	396

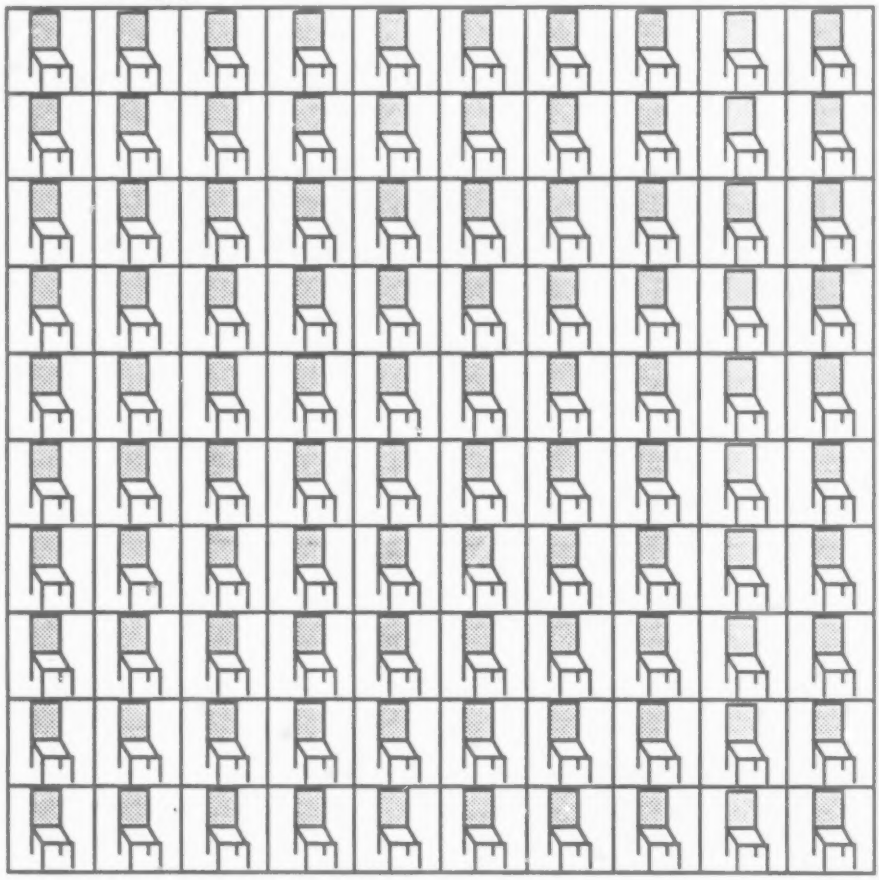
2. How many seats are in the World Stadium altogether? 3416

WORLD STADIUM MANAGEMENT SHEET

Where are their seats in the stadium?
Cut out the flags and place them in the correct section on the Seating Chart after you have recorded the information on the World Stadium Planning Sheet.

- - - - - - - - - - - - - - - - - - **Cut here**- - - - - - - - - - - - - - - - -

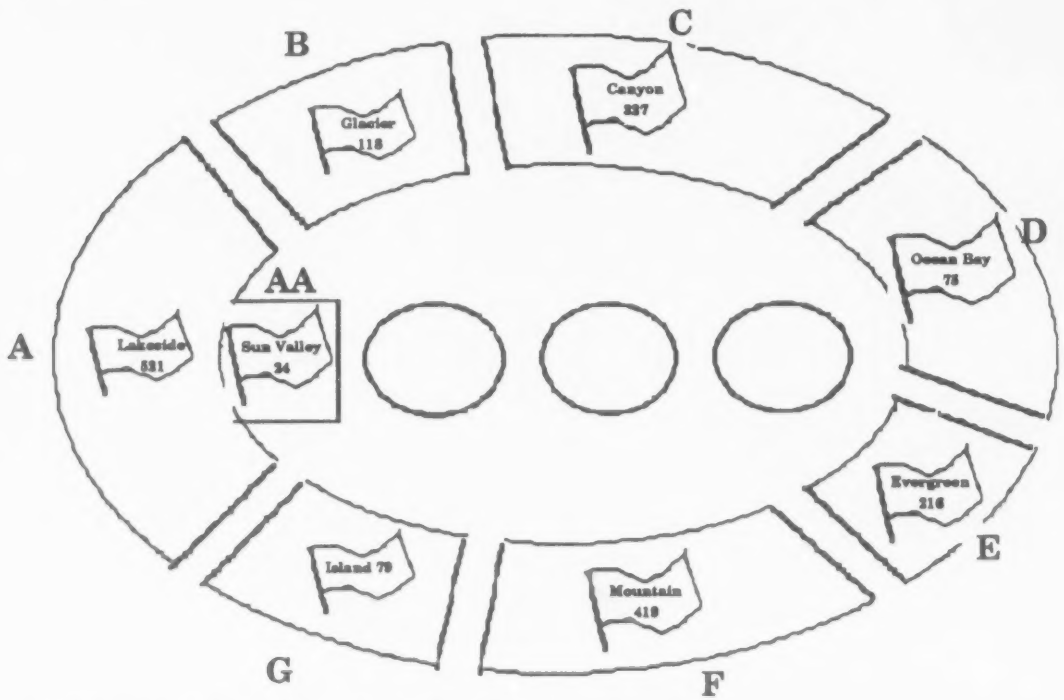
How are the seats arranged in Section AA?
Use the squares to help you.



NAME _____

WORLD STADIUM - HOME ACTIVITY

Directions: Use the memory keys on your calculator to complete the chart and answer the questions.



1. What is the total number of seats in each section?

   Hint: Enter the seating arrangement.
   Press [MRC] to see the total.
   Write the total on the chart.
   Press [MRC] again to clear the memory.
   Press [C] to clear the display.

SECTION	SEATING ARRANGEMENT	[MRC]	TOTAL NUMBER OF SEATS
AA	(4 x 5)+(4 x 3)		
A	(12x30)+(12x27)		
B	(12x18)+(12x15)		
C	(12x32)+(12x28)		
D	(12x11)+(12x10)		
E	(12x10)+(12x8)		
F	(12x32)+(12x28)		
G	(12x18)+(12x15)		

2. How many seats are in the World Stadium altogether? ☐